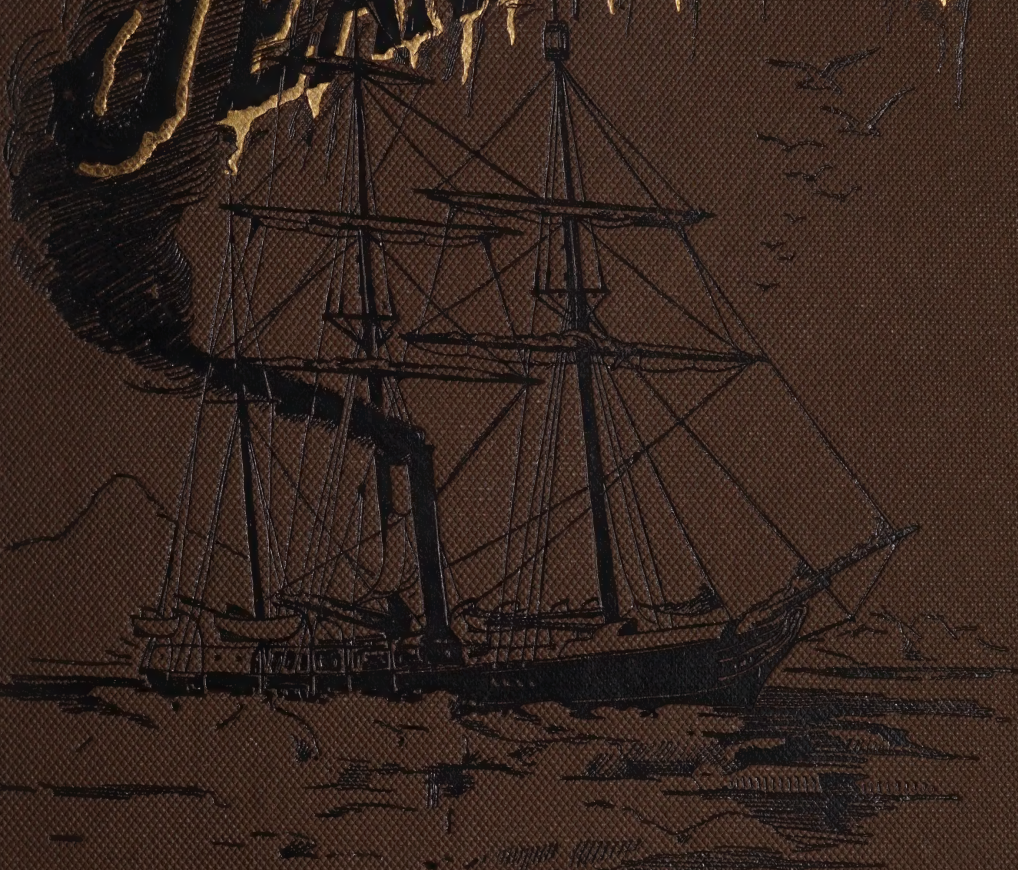


THE VOYAGE

OF THE

JEANNETTE



ILLUSTRATED

JOURNALS OF LEUT. COMM. DE LONG



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Sergeant W. D. Lang

THE
VOYAGE OF THE JEANNETTE.

THE SHIP AND ICE JOURNALS

OF

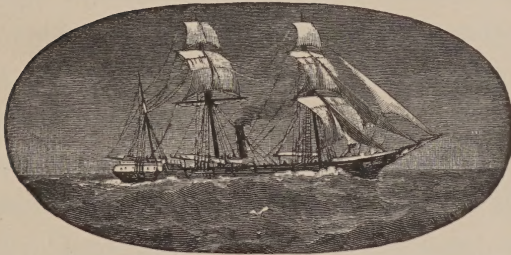
GEORGE W. DE LONG,

LIEUTENANT-COMMANDER U. S. N., AND COMMANDER
OF THE POLAR EXPEDITION OF 1879-1881.

EDITED BY HIS WIFE,

EMMA DE LONG,

*WITH TWO STEEL PORTRAITS, MAPS, AND MANY
ILLUSTRATIONS ON WOOD AND STONE.*



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PREFACE.

IN the preparation of this volume the editor has availed herself first, of the private papers of Lieutenant-Commander De Long, and her own recollection and notes; and secondly, of the testimony given in public and private by the survivors of the *Jeannette*. It seemed right, in a work which is essentially a tribute to human worth, to introduce the narrative with a brief biographical sketch of the commander of the expedition up to the inception of the undertaking, with special reference to the qualities of character and education of circumstances which led directly to his proposal of an Arctic expedition. The preparations for the voyage continue this personal sketch, as well as put the reader in possession of all necessary facts relating to the plans of the projectors and the measures taken to ensure success.

So much was requisite as an introduction to the narrative itself. For that recourse was had to the letters written by Lieutenant-Commander De Long after leaving San Francisco, and before dismissing the consort which accompanied the *Jeannette* to St. Lawrence Bay; to the private journal which he kept from the beginning of the voyage to the sinking of the ship, and to the two small journals in which he recorded the fortunes of the expedition after the ship was abandoned.

In preparing the closing chapters of the work, the testimonies given by the survivors have been carefully compared and made the basis for a consecutive narrative which should complete the history of the expedition.

The illustrations have been studied with great care. The smaller ones in the text have been reproduced from diagrams and sketches made in the journals, by Mr. Newcomb, the naturalist of the party, and by Captain Grönbeck of the *Lena*; the larger ones have been from the hand of Mr. M. J. Burns, whose experience in the Arctic had given him special facility for making truthful renderings, and his work has been carefully examined and approved by officers of the expedition. The portraits have been taken from the best sources. That of Lieutenant-Commander De Long is from a painting by Mr. E. W. Perry; that of Mr. Bennett was engraved for this work; and those of the officers and other members of the expedition are from the best photographs obtainable. The tinted lithograph of the cairn tomb is from a drawing made on the spot by Mr. A. Larsen. The maps were drawn for the work, with the exception of that descriptive of the route of the *Little Juniata*, which is a reduction of the government map in the "Voyage of the *Polaris*."

The scientific results of the expedition are only partially recorded in the text of the work and in papers included in the Appendix. The government will hereafter issue the notes of the naturalist, the meteorological observations, and the electrical and auroral

observations of Lieutenant Chipp, and it has been thought advisable, therefore, to omit them from this work.

The thanks of the editor are due to Mr. James Gordon Bennett for his constant sympathy, interest, and aid ; to Chief-Engineer Melville for his frequent assistance and special contributions ; to the other survivors of the Jeannette for their cheerful and ready response to all requests for information ; to Colonel W. B. Remey, Judge Advocate General U. S. N., and Lieutenant W. H. Jaques, U. S. N. Finally, the editor desires to acknowledge gratefully the consideration and kindness which her work has met with from the Secretary of the Navy and other members of the Department at Washington.

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THE VOYAGE OF THE JEANNETTE.

CHAPTER I.

THE COMMANDER OF THE EXPEDITION.

Parentage and Birth. — Early Influences and Surroundings. — School Life. — The Choice of a Profession. — In the Law Office of Hon. John Oakey. — Forces his Way into the Naval Academy. — A Midshipman who dispenses with Red Tape. — Death of his Parents. — Marriage under Difficulties. — Promotion. — On the Juniata. — Commanding the Little Juniata. — A Perilous Boat Journey. — His Recollection of his Experience. — The Arctic Fever. — Powers of Endurance. — Temperament. — Frolics. — His Dealings with Men. — Testimony of an Associate.

GEORGE WASHINGTON DE LONG was born in the city of New York, August 22, 1844, of a family of Huguenot descent. His parents, who moved to Brooklyn when he was four years old, had no other child, but they had adopted a niece of his mother's, who was his principal playmate. His childhood was one of great seclusion. His mother, especially, was almost morbidly solicitous for him, so that he was jealously guarded from outdoor influences, and restrained from the ordinary sports of boyhood. The world seemed to the anxious mother full of perils for her boy, and she was unwilling that he should meet them in the near pursuits of swimming, boating, and skating. Home was made bright and happy, and every innocent and safe

pleasure granted him, not only out of parental love, but with the constant purpose to shield him from danger and accident. His father was of an easy temper, who interfered but little with his education, only exacting strict obedience.

It was not hard for the boy to give this obedience, for the commands of the mother were never direct but through the subtler influence of a strong maternal love, and the disposition of the boy was one of generosity and docility. He was a hard student, thorough in his application to books, and faithful to his school work. His spirit and energy, hemmed in upon the adventurous side, found exercise in an intellectual ardor, and he was a fiery little orator and writer. Nevertheless, and it may be because of the repression to which he was so constantly subjected, he was restless and filled with an uneasy desire for larger liberty.

When he was eleven or twelve years of age he fell in with some tales of naval exploits of the War of 1812, which recounted the heroism of young midshipmen, Porter and Farragut being especially named, and his ambition was kindled to make as great a reputation for himself in the same profession. Shortly after, in 1857, he was selected as a candidate, from the public school which he attended, for an appointment to the Naval Academy, but his parents refused their consent, to his bitter disappointment. They had other plans for him, and proposed to enter him at the Free Academy, now the College of the City of New York, when an accident occurred which led to a change in his life. On one of those straight marches home from school which parental law had made a part of the routine of his life, he was the mark for a party of his companions who shot their snow and ice balls at the exclusive little

De Long. A blow on the ear caused an injury which required two or three months' detention in the house under the doctor's care, and in this enforced leisure the boy and his mother discussed his future career. She gave him the choice of being a doctor, a priest, or a lawyer, and of the three professions that of doctor seemed to open the largest promise of activity. At any rate, when the boy had recovered he proposed to find out something about the life before he prepared for it, and so engaged himself with his friend who had been treating him, and stayed with him several months.

A familiarity with the outside of a doctor's life and an attendance upon a few painful operations satisfied George De Long that he had no aptitude for this profession, and he found little difficulty in bringing his mother to his way of thinking, when he unfolded to her the incessant risks which a doctor ran of contracting a great variety of contagious diseases. The next profession was that of divinity, and his mother was urgent that he should study for orders; but without going through any preliminary experimenting with the life of a priest, the boy resorted to the argument which had already served him well, and drew such a picture of the privations and hardships of a priest's life, and the dangers to which he was exposed in his contact with the sick and the dying, that he succeeded in dimming for his mother the brighter spectacle of a possible cardinal, and in securing a reprieve for himself.

The arguments which he employed were the ingenuities by which he persuaded his mother; they were not the convictions which moved him. He had a resolute, courageous spirit, which impelled him to a life of free activity; but he had also the fine spirit of obedience and loyalty, which forbade him to break away

from the restraints of home, and roughly rebel against the authority of love. Meanwhile he amused himself with books, the friends which his secluded life had given him, and spent day after day at the Mercantile Library, where he read voraciously, feasting especially upon books of adventure and travel. He attached himself to the librarian, helped him about his duties, and even filled the office for a few months during an interregnum. His restlessness was not satisfied, but was stimulated by his reading, and Captain Marryat and other seductive mariners again gave him an almost uncontrollable longing for the sea.

He was still, however, an obedient son, and when his parents refused to yield to his wishes, he yielded to theirs, and entered the law office of the Hon. John Oakey, who became warmly attached to the boy and placed great confidence in him. It was shortly before the breaking out of the War for the Union, and upon Mr. Oakey's entering the service, George begged hard to accompany his friend, and urged him to use his influence in persuading the inflexible parents. Mr. Oakey did indeed urge them to let the boy go, telling them that a little rough experience would curb his restless and ambitious spirit, and make him more willing upon his return to remain at home the rest of his days, — a well-worn line of reasoning which often has an uncommon likeness to good sense.

It may readily be believed that the perils of army life would scarcely affect the imagination less than those belonging to a learned profession, and neither the boy nor Mr. Oakey could carry the day. This incessant friction, however, began to produce its result, and it is not unlikely that as George's ardor was increased by his sense of national danger, so his parents' will was

weakened by the contagion of spirit in the community. A place in the army had been denied the boy, and he turned again with redoubled zeal to his first love, the navy. He went to his father and said: "I want to go to the Naval Academy. You say you will not assist me; but if I obtain an appointment myself, will you give me your consent and allow me to enter?" His father laughed at what he thought was his hopeless determination, and answered, "Very well, if you can accomplish such a feat, I will make no further objection," and his mother also gave her consent to what she imagined to be impracticable.

With this perfunctory sort of permission the boy went to work with a will. He wrote to Washington for the necessary information regarding candidates, and then applied to know if there were any vacancy to be filled by an appointment from the Third Congressional District, represented at the time by Hon. Benjamin Wood. The Department replied that there was no vacancy, that gentleman having made his appointment. George meanwhile had enlisted the aid of his friend Mr. Oakey, who went at his request to Mr. Wood and urged the boy's name, and of Father, now Vicar General, Quinn, who was Mrs. De Long's spiritual adviser. Father Quinn knew the boy well and was ready to help him. He also went to Mr. Wood and easily proved himself a powerful ally. It must be said, however, that there was no influence quite so effective as the boy's indomitable will. He learned suddenly that a cadet who had been appointed by Mr. Wood had been obliged to leave the Academy from some affection of the eyes. This was his opportunity, and he gave no one any rest till he received the appointment, when he went to Newport, where the Academy was then stationed, and passed his examination.

Just at this juncture the officers at the Academy received a dispatch from Mr. Welles, Secretary of the Navy: "Do not accept Mr. Wood's appointee for the navy." Back to New York rushed De Long and demanded of Mr. Wood the reason for the dispatch. Mr. Wood showed him a letter from the Secretary, by which it appeared that the nomination of De Long had been delayed, and that the cadet whose place he was to fill had recovered his health and been reinstated. "So that ends the matter," said Mr. Wood; but it did not at all end it in De Long's mind. He burst into a vigorous invective against the Department. It was all wrong. Mr. Wood had been imposed upon. It was because he was a Democrat that this injustice had been done, and the Republican Secretary was depriving the Congressman of his rights. He ought not to stand such treatment an hour. Mr. Wood was amused and moved by the zeal of the young advocate, and finally said: —

"Do you sit down, Mr. De Long, and write what you want to the Secretary. I will sign the letter, and you can take it to Washington yourself if you like."

The letter was written and De Long set off at once to Washington. It was in the fall of 1861, when the trains were packed with soldiers, and the boy had to stand all the way from Philadelphia to Washington. He reached the city at six in the morning, and as soon as he could get something to eat, presented himself at the door of the Secretary's office, and was ready when the hour came for business. He entered and handed Mr. Wood's letter to the Secretary. Mr. De Long often enjoyed telling of that interview; how he watched the various expressions of Mr. Gideon Welles's face as he read the tempestuous letter, which the boy had written

When the Secretary finished, he pushed his spectacles up and looked at his visitor.

“And you are Mr. De Long, are you? Well, well, this is a very strange state of affairs. Mr. Wood seems very much excited; but he is laboring under a delusion. We have no intention of slighting him in any way. You can return to the Academy. I will give the necessary orders for your reception there, and please say to Mr. Wood that he shall not be deprived even of his imaginary right.”

So it happened that there were three cadets from the Third Congressional District this time, and one of them, who had won his position by sheer persistence, was entirely satisfied with the state of affairs. He applied himself vigorously to the work of the Academy, and was graduated with distinction in 1865, just as the war came to a close.

He received his first orders for sea duty in November of that year, when he was ordered to Boston to report to Admiral Stringham for duty on board the U. S. Steamer *Canandaigua*. Upon arrival at the navy yard he went at once to the vessel to inspect his quarters. He looked all over the ship, and finally entered the steerage where he was to spend the next two years. He inspected it very thoroughly and found that there were but two berths in it, while it was to be occupied by four midshipmen; two therefore, it was plain, would have to swing in hammocks. This was not at all according to his views of what was proper, and off he set to see the admiral about it, and have the matter righted. On his way across the yard, he met some officers who asked him where he was going. He told his errand, and they at once approved it in the most emphatic manner.

“That’s right!” they said. “The thing should be attended to. Just speak to the admiral positively about it, and you’ll get what you want.”

The young midshipman was shown into the office of Admiral Stringham, an erect gentleman with white hair, and sharp black eyes, who sat at his desk writing. His visitor advanced toward him, cap in hand, and said:—

“Admiral, I am Midshipman De Long of the U. S. Steamer Canandaigua. Sir, I have been inspecting my quarters on board, and I find only two bunks in the steerage for four midshipmen. I came, sir, to ask you to have two more berths put in before we start for sea.”

The admiral looked up quickly and said: “So you are Midshipman De Long of the U. S. Steamer Canandaigua?”

“Yes, sir.”

“Well, Midshipman De Long of the U. S. Steamer Canandaigua, I advise you to return on board the U. S. Steamer Canandaigua, and consider yourself very happy that you have any bunks at all in the steerage.”

The admiral was better than his word, however. His amusement was greater than his amazement, and he ordered the additional bunks to be made. Years afterward he met again the innocent and resolute midshipman and laughed heartily over their first encounter.

The cruise of the Canandaigua was along the western coast of Europe and Africa and in the Mediterranean, and was a little over three years in duration. Mr. De Long was promoted successively to be ensign and master, and, shortly after his return to New York, to be lieutenant. After a short leave of absence, he was ordered to the U. S. Steamer Lancaster, then at Norfolk,

Va., but while she was preparing for sea he was placed on duty in Washington for practice in signals. Whilst on this duty he was telegraphed for to come to his mother's sick-bed. His father had died while the Canandaigua was absent on her cruise, and Mrs. De Long had been left alone. She had a passionate love for her son, and his long absence, in a life which was repugnant to her choice for him, was a grievous burden to her. She was brave and unselfish, and refused to embitter his life with her complaints; but her death, which occurred now, brought afresh to him a sense of the relations they had sustained to each other, and his naturally buoyant nature was greatly depressed when he re-joined the Lancaster, which had been ordered to the South Atlantic.

His depression was deepened by the fact that he was waiting for the expiration of a three years' delay, which had been agreed upon between him and the father of the lady to whom he had offered himself in marriage, and whom he had met at Havre, where she was living at the time of the Canandaigua's cruise in French waters. His eager, impetuous nature wore out two of the three years, when the delay became insufferable. He obtained leave of absence, and presented himself in Havre in February, 1871, where his persistence and resolution made good the third year of his waiting. The Franco-Prussian War was nearing its close. An armistice had been declared, but Havre was accessible only from the sea; communication with Paris was cut off by the Prussian army and the breaking up of bridges and railways. The harbor was occupied by a number of foreign men-of-war, sent for the protection of neutral interests, and among these was the U. S. Steamer Shenandoah.

Such neutral interests as Mr. De Long enjoyed were especially in need of protection by a United States man-of-war; for after all difficulties had been removed, and the resolution taken at noon of March 1st to have the marriage performed in the evening of that day, since the bride's father was compelled to return to America, fresh difficulties sprang up. Marriage in France is a civil contract, and Mr. De Long saw the necessity of securing the presence and services of General Glasgow, the United States Consul. The consul, however, had gone into the country, and for several hours the anxious bridegroom was driving frantically about on a search for him. General Glasgow, when he was at last found, began to explain the formalities which were required; but Mr. De Long was too busy for any trivial matters, and was off on the more important errand of buying a wedding ring. The bride's family meanwhile had secured the services of the Rev. George Washington, a clergyman of the Church of England.

At eight o'clock a few guests assembled, and the clergyman and consul were present. Everything was in readiness when General Glasgow turned to the clergyman and said: —

“I suppose you have the proper authority to perform this ceremony. You know in France marriage is a civil contract.”

“I have no authority whatever,” he replied; “but I suppose that if you, as United States Consul, witness the ceremony, the marriage will be legal.”

“On the contrary,” said General Glasgow, “consuls have no power to marry or witness marriages on French soil; the United States Minister at Paris is the only person having such authority. This marriage cannot proceed; it will not be legal.” Here was a sore

perplexity. It was impossible to send for Mr. Washburne ; it was impossible for Mr. Washburne to reach the waiting couple. Moreover, the steamer which was to take Captain Wotton, the father of the bride, was to sail for America in a couple of hours. The fates seemed against the marriage, and Mr. De Long was looking in vain for a way out of the dilemma, when the consul, whose learning had been so destructive, suddenly drew upon his reserve legal forces, and exclaimed : —

“There is a United States man-of-war in port, and under the flag she flies this clergyman has a perfect right to perform the ceremony of marriage between two American subjects.”

This simple and brilliant expedient was seized upon with alacrity. Messengers and servants were sent off in various directions. Captain Wells of the Shenandoah, who was a friend, immediately prepared his ship for the ceremony by displaying all his bunting and decorating with Chinese lanterns. He sent boats for the party, who rowed out at half after nine of a brilliant starlight night, and were received by the officers in full dress uniform, and with all the music that could be summoned. The following entry was made in the ship's log: “March 1, 1871. From 8 P. M. to midnight. . . . At 10 P. M. the ceremony of marriage between Lieutenant George W. De Long, U. S. Navy, and Miss Emma J. Wotton, of Hâvre, was performed by the Rev. Dr. Washington, of the Episcopal Church of Hâvre.”

At the end of April Lieutenant De Long was ordered to duty in the Equipment Department at the New York Navy Yard, and in January, 1872, he was ordered to the Nantasket as executive officer. The ship cruised in the Gulf, and in July he was detached from the

Nantasket and ordered for the same duty to the Frolic, stationed in New York Bay.

At the close of January, 1873, Lieutenant De Long was ordered to the *Juniata*, which was attached to the North Atlantic squadron. While at New York, in May of the same year, news came that Captain Tyson, seaman Nindemann, and seventēen others of the crew of the Arctic exploring steamer *Polaris*, had been picked up by a whaler, while floating south on an ice-floe. The report which they gave of the condition of the *Polaris* induced the United States Government to send a man-of-war to the relief of that vessel, and the *Juniata* was selected for the duty. She was slightly strengthened for her special work, and dispatched to the coast of Greenland. Lieutenant De Long entered into the plans of the voyage with alacrity, and though separating from his wife and child, he announced his intention of volunteering for any unusual duty which might arise. Something of the spirit in which he engaged in the enterprise may be gathered from a letter which he sent home while on the cruise. Writing from Sukkertoppen, Greenland, July 16th, he says : —

“ Thus far the trip has been a very monotonous one to me, and I don't suppose I shall begin to see any excitement in it till our boat expedition leaves the ship at Upernavik. Then to me the desirable portion of this trip will begin ; and if with the blessing of Providence we are so fortunate as to find the *Polaris* and her people, I shall consider our trip to Greenland and its icy mountains as one well worth remembering.”

The *Juniata* reached Upernavik, Greenland, without coming upon any further intelligence of the *Polaris*, and it was not deemed prudent to take her further to the north. Instead, it was thought best to send a boat expedition to make a search along the coast, and Lieu-

tenant De Long at once volunteered to take command of the search party. Captain Braine accepted him and gave him orders for the expedition. These orders, and an extract from the report which Lieutenant De Long made upon his return, will best describe the search, and the report will show more clearly than any comment upon it the courage, resolution, and coolness of the commander of the perilous boat expedition : —

U. S. STEAMER JUNIATA (3d rate).

UPERNAVIK, GREENLAND, *July 31, 1873.*

LIEUTENANT GEORGE W. DE LONG, U. S. N.,

Commanding the Steam-Launch Juniata.

SIR, — The Little Juniata, the largest steam-launch of this ship, has been carefully strengthened with outer planking, also with an iron stem plate, and her propeller guarded with an iron frame. She is thoroughly equipped, arranged, and provisioned for sixty days, under your supervision, for a search for the U. S. Steamer Polaris, along the fast inshore ice to the northward of this place towards Melville Bay.

You will assume command of her, and at the first appropriate moment proceed to carry out said search as far as it is positively prudent to advance to the northward.

In navigating these northerly and almost unknown waters, much must be left to your discretion, and your movements must be controlled by the short time the U. S. Steamer Juniata will remain at Upernavik, which is until August 25, 1873.

You are enjoined to advise with the ice-pilot furnished you, who has twice passed over the waters you are about to navigate and wintered in the frozen Arctic regions.

The Little Juniata is not to be jeopardized or pushed into the ice-packs, if you meet them; nor is she, or the lives of those on board, to be involved in any way it is possible to avoid; for you must remember that the U. S. Steamer Tigress, a vessel equipped and prepared for ice cruising, will soon proceed to Baffin's Bay into Smith's Straits, to search for the Polaris, up to the point where she was last seen (Northumberland Island) in October, 1872, and you are reconnoitring,

previous to her going possibly to pass an Arctic winter in 77° North.

Should you find the *Polaris*, or her officers and crew, you will return with dispatch to Upernavik, at which place the *Juniata* will remain up to the date previously mentioned; and you are not, under any circumstances within your control, to be absent from this ship beyond fifteen days; for which time you have coal, at a daily consumption of five hundred pounds.

Should you not find the *Polaris* by the time you have consumed one half of your coal, you are to return to Upernavik, and sooner if you meet any formidable ice obstructions.

Should the U. S. Steamer *Tigress* leave Upernavik before you return, she will be directed to keep a lookout for you; and should you meet her under any circumstances that warrant it, you will remain with her, if her commander deems it most prudent you should do so; but, should the *Little Juniata* be able to prosecute the voyage of return to Upernavik, I wish you to do so, and be at that place on or before August 25, 1873.

Should you not be at Upernavik by that date, I will leave there coal and provisions sufficient for your return to Godhavn, Disco Island, where I expect to remain until September 20th or 25th, or the latest days previous to the close of navigation by the ice in those waters.

With hopes your search will prove successful, and that you may find the *Polaris*, or gain some tidings of her, or be the means of conveying through the Esquimaux to those on board the news of the vessels now in search of her, I sincerely wish you success in your undertaking. I assure you I shall await with great interest your return to this ship from the hazardous duty for which you and those associated with you have volunteered. You will be accompanied by Lieutenant Charles W. Chipp, U. S. N., Ensign Sidney H. May, U. S. N., Pilot Henry W. Dodge; Richard Street, Boatswain's Mate; Frank Hamilton, machinist; William King, seaman extra; Martin T. Maher, ordinary seaman.

I am, most sincerely yours,

D. L. BRAINE, *Commander U. S. N.,*
Commanding U. S. S. Juniata and Senior Officer present.

An Esquimau, Jacob Lÿnghe, accompanied the party as an interpreter and coast pilot between Upernavik and Cape Shackelton. Lieutenant De Long's report of the expedition notes that he had before been charged by Commander Braine with all the necessary preparations for the expedition when the Juniata was at St. John's, Newfoundland, where the launch had been specially strengthened.

The dimensions of the Little Juniata were:—

Length over all, 32 feet 6 inches.	Breadth, 8 feet 4 inches.
Length of keel, 28 feet 3 inches.	Depth, 4 feet 4 inches.

She was sloop-rigged and carried a three-bladed propeller.

“On Saturday, August 2d, at 12.55 P. M.,” the report proceeds, “the boat being in readiness, provisioned, and supplied with four tons of anthracite coal, I received your final orders and shoved off from the ship with the dingy, containing twelve hundred and seventy-eight pounds of coal, in tow, and heartily cheered by the ship's company, proceeded on our voyage to the northward under steam, with a fine breeze from the southwest. I immediately organized the party and divided them in two watches: one in charge of Lieutenant Chipp, and consisting of himself, Mr. Dodge, Hamilton, and Street; and the other in my own charge, and composed of the remaining four of the party, the Esquimau being for the present excluded. This arrangement of watches was kept up during our entire absence, the officers and men working alike, and turning in and out with each other.

“At 3.30 the same afternoon we passed the small settlement of Kingitok, about twelve miles to the northward, and working our way among countless icebergs and through narrow passes between islands, arrived without accident at Tessi-Ussak at eleven o'clock that night, and in obedience to your orders left the dingy at that place to be brought back by a Danish boat, landed six hundred pounds of coal from her for our use on returning, took the remainder into the launch, and were ready to depart at midnight. The weather, however,

had set in bad, blowing fresh from the southwest, with a thick fog, and I deemed it prudent to wait until morning, or until there was some chance of working through the fog with safety.

“Tessi-Ussak is a small place of some half dozen Esquimau huts, besides the house in which the chief trader, Jensen, resides. Jensen is the Dane who accompanied Dr. Hayes on his several expeditions, as a dog driver and hunter, and is ap-



Chas W Chip

parently an excellent man, speaking English well, and willing and anxious to be of service to Americans, of whom he speaks in the most enthusiastic terms. At his hands we received a warm welcome, and such hospitalities as his recent arrival and consequent unsettled condition would permit.

“Tessi-Ussak has a small harbor, but it is nearly always full of icebergs, and we were forced to anchor among them, too close for comfortable contemplation, and with the chance of any one of them turning over upon us. The night being rainy and comparatively warm (45°) many icebergs broke up, and the cracking and breaking and turning over and over continued during our entire stay.

“At ten A. M. Sunday, August 3d, the fog having lifted to some extent, we got under way and steamed away to the northward, passing in between Brown Island and the mainland, working our way among icebergs and keeping close in to the mainland to keep in smooth water, and to be ready to slip in and anchor, should a fog overtake us. At four P. M. had passed Cone Island and Wedge Island to the westward, and sighted Cape Shackelton and the Horse's Head, a prominent island off this cape, right ahead. Passed to the eastward, of the island, and at eight P. M., having Cape Shackelton close aboard, determine the position of the boat to be in lat. $73^{\circ} 42'$ N., long. 57° W.

“I had calculated before leaving the ship that we should be enabled with an expenditure of five hundred pounds of coal per day to make an average speed of four knots per hour under a steam pressure of twenty pounds; and with a view to keeping the feed water for the boiler as fresh as possible, a steam-pipe had been carried from the boiler to the water-tank, for the purpose of melting fresh-water ice, which we should pick up on the way, and put in the tank. We found upon trial thus far that the expenditure of steam to melt the ice was too great to keep up our proposed speed, and I concluded to supply the boiler with salt-water, which of course we had to dip up from the water outside. Running with salt-water increased our expenditure of fuel, and I now feared that, instead of coal for fifteen days as originally calculated, we would have only enough for eight days. With our sails we may be able to do better, should we be favored with fair winds. This day we had light northerly winds, smooth sea; average temperature of the air 45° , of the water 41° .

“At four A. M. Monday, August 4th, passed inside of the Duck Islands, Baffin Islands bearing true N. E., weather thick, breeze coming up fresh from N. and W. and cloudy, with indications of coming fog. This state of affairs continuing at three P. M. I kept the boat away to the eastward, made sail, and stood in for a headland, which, from its position and my calculation of the boat's run, I assume to be Wilcox Head, in about lat. $74^{\circ} 40'$ N. In getting under this headland, the fog continuing, we made the boat fast to an iceberg, and waited

for a clearing up. At five P. M. the fog clearing, we slipped from the berg and rounded the headland to the northward. My object in keeping in close to the shore, though we were working through icebergs, was to get a sight of the Devil's Thumb, a remarkable pillar of land north of Wilcox Head, and from which I intended to take a fresh departure for crossing Melville Bay. But on rounding Wilcox Head we saw nothing of the Devil's Thumb, and I imagined I might have been deceived in the boat's position in the afternoon. Our accommodations were so limited, the boat had to carry so much, and the difficulty, not to say danger, of getting outside of the boat was so great, that the log could not be hove with any accuracy, and our reckoning was at the best not the most reliable. The currents set us out of our reckoning frequently, sometimes being to the northward and sometimes to the southward.¹

“Discovering another high headland to the northward of the supposed Wilcox Head I stood on, getting in tolerably open water, and having a smooth sea and no wind with clear sky, we headed for this new high land. On going below at eight P. M. I directed Lieutenant Chipp to call me when nearly up with this headland, or in case of any change in the weather. At ten P. M. Lieutenant Chipp called me, a fog having shut in, and land being entirely obscured, much ice being encountered in the shape of pack ice and icebergs, and some new ice an inch in thickness. I immediately put about and attempted to retrace our way, which we succeeded in doing for several miles, but finally, owing to the increasing thickness of the fog, we missed our track and were brought to a stand-still in the pack. As far as we could see we were caught in solid ice from about one to two feet thick, with large hummocks and icebergs surrounding us. By steady ramming of the ice and

¹ It is well to note here for the information of any who may get into Allison Bay, that the chart is wrong in leaving it to be imagined that the bay is free except as to icebergs. It is filled with small islands, running along about fifteen miles from the glacier line, and extending from Cape Seddon nearly fifteen miles to the southward toward Wilcox Head. — G. W. De L.

working a clear space about us, we occasionally made small cracks in the floes, and succeeded in forcing our way a little at a time, getting occasionally in open patches of water and among loose ice, and making two or three miles before being brought up again by solid ice. I had headed the boat to the westward on losing our way in the ice, and I knew that every foot we made in that direction was toward the open water. The temperature was from 30° to 32° , the rigging was covered with rime, and the new ice was rapidly forming around us and increasing in thickness. I did not dare to stop for a clearing up of the fog, lest we should be firmly frozen in, and so kept the boat under way with full steam pressure, grinding through the ice where we could, ramming it wherever there was a chance of success, and following every little lead to the westward.

“In all this I was guided by Mr. Dodge, the ice-pilot, whose previous experience in the Arctic regions enabled him to give me good advice, and upon whose judgment in this emergency I relied, and handled the boat accordingly. The plan of keeping to the westward proved a wise one, for at 8.30 A. M. we were rewarded by coming into quite large spaces of open water, and at nine A. M. were pleased to detect a little swell, giving indications of an approach to the open sea beyond. By ten A. M. we were quite clear of the pack after our twelve hours of uneasiness, and with no more damage to our little craft than a slight scratching and splintering of our strengthening plank, occasioned by the new ice through which we forced during the night.

“I immediately headed the boat to the N. W. (true), N. E. magnetic, and the fog clearing up by noon, we sighted at two P. M. three islands on our starboard quarter, the Sabine Islands, marked on the chart as being in lat. $75^{\circ} 28' N.$, long. $59^{\circ} 55' W.$ At the same time made out the glaciers beyond to the N. E., a large number of icebergs, and a curious looking hill with two peaks, which no doubt was the Cape Walker marked on the chart, or land in its immediate vicinity. Generally speaking, the chart is inaccurate to a great extent to the northward of Cape Shackelton, the coast line, as we found

it, being nearly always a glacier line. To the best of our ability to see and judge, the ice-pack was tolerably solid from these Sabine Islands to the coast, showing that we were not far removed from the edge of the Melville Bay pack. The entire bay was dotted with clusters of icebergs.

“Between four and six P. M. we were favored with a light fall of snow, the thermometer standing at 42° , with a light S. E. wind and moderate swell. Knowing that everything that could be accomplished by the boat must be done in fine weather, and that it would be well to keep a hold on the land as much as possible, owing to the uncertainty of our position and the inaccuracy of the chart, I determined to push on with greater speed, in order to be as near the land as possible, which at its nearest point was about fifty miles distant, and to this end fired up afresh, making a large hole in our fuel.

“At eight o'clock the next morning, Wednesday, August 6th, we had no land in sight ahead, but we found ourselves on the edge of the ice-pack, with a thick fog shutting in and no signs of a lead through. At about eleven A. M. land showed itself abeam, bearing N. E. (true), in the shape of two high hills, which Mr. Dodge recognized as the Peaked Hill, marked on the chart as being in lat. $76^{\circ} 18' N.$ and long. $62^{\circ} W.$ Just as we sighted this land, Mr. Dodge discovered a lead in the pack to the westward, but the fog shutting in thicker than ever, we were unable to follow it, and I decided to anchor to an iceberg rather than risk the boat on the edge of the pack. We accordingly made our ice-anchor fast at one P. M., but discovering the berg to be full of cracks and looking very much like breaking up, I shifted our anchorage to a small ice-cake and banked fires.

“At this point I took an account of fuel remaining, and calculated that it was very nearly half gone. We had accomplished this distance without any more serious mishap than our danger of being firmly caught in the ice in Allison Bay. Cape York was only forty miles off, and the people of the *Polaris* might be there waiting for relief. In the foggy state of the weather burning coal without advancing would be a waste of fuel, and I decided to let the fire go out under the boiler, hoping to ac-

compish something under sail should the fog lift or a chance present itself of getting open water to the northward. Accordingly, in the morning of Thursday, August 7th, we let the fire die out. The thermometer was at this time at 38°, but we suffered no additional inconvenience on that account.

“ During the forenoon it promised several times to clear up, the sun showing itself occasionally for a few moments, but with little or no effect on the fog. Becoming tired of inaction we slipped from the ice at 9.45 A. M., and making sail stood to N. W. (true) with a light S. E. wind and swell.

“ At noon I determined the position of the boat to be in lat. 75° 52' N., long. 64° 05' W. by our dead reckoning, and the last bearing we had of the land in the neighborhood of the Peaked Hill. At four P. M. came in sight of the ice-pack again, and immediately hauled the boat up to W. N. W. (true). Discovering a lead in the pack to the northward and westward, stood into it for about five miles until Mr. Dodge pronounced it a false lead, the ice closing in ahead, four feet thick, some of last year's ice, and some older. Brought by the wind and beat out of the lead. At eight the wind freshened from S. S. E. and we commenced to work to the westward, as much as possible keeping clear of the ice. At midnight hauled alongside of an iceberg to fill up with fresh-water ice for drinking and cooking. Moderate sea.¹

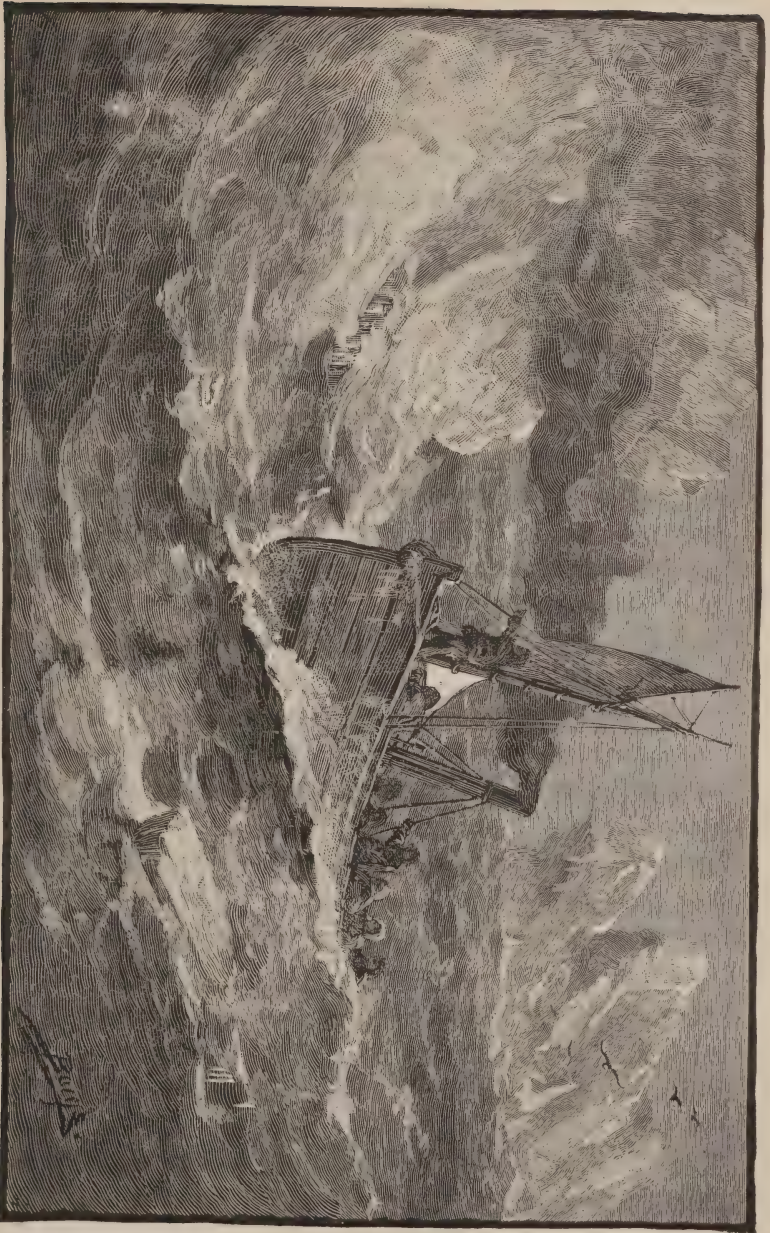
“ At 1.30 A. M. Friday, August 8th, sighted high land, bearing N. W. by N. (true), and trending away to the northward in an apparently low neck. This Mr. Dodge pronounced our anxiously looked for Cape York, and at 2.30 A. M., having worked clear of detached pieces of floe ice, stood in toward the land, which we calculated to be about eight miles distant. At three o'clock A. M. the fog shut in again thick and we lost sight of Cape York. At the same time the wind freshened to a gale

¹ It was while thus employed that Mr. Dodge, the ice-pilot, noticed a crack in the berg, and mentioned the fact to Lieutenant De Long. The order was at once given to shove off, and the Little Juniata had scarcely reached a safe distance, when, with a loud report, the iceberg was rent in pieces. The launch was tossed and tumbled by the waves caused by the commotion, but otherwise escaped unharmed.

from the S. E., and I was compelled to bring the boat by the wind and reef down as snug as possible. At this time, had we been in open water, Cape York could have been reached without any difficulty, but as far as we could see to the northward, the ice was in a solid pack three to four feet thick, and we were struggling along on the edge of it looking for a lead, and working to the westward in so doing. To the N. E. the ice was also in a firm pack, with icebergs and hummocks close enough to prevent the opening of the ice to any extent. At noon I establish the position of the boat in lat. $75^{\circ} 48' N.$, long. $66^{\circ} 50' W.$

“In the afternoon the S. E. gale had caused a fearful sea, and working as we were on the edge of the ice-pack, our situation became one of great danger. The wind had started the Melville Bay pack out from the land, and to the northward and westward, making a regular bight in which we were fairly placed. We had to carry sail in order to keep the boat under control. Steam would have been of no use, since the Little Juniata could not for one moment have steamed against such a gale. Laying to was not to be thought of, lest we should drift to the pack and be ground to pieces. The prospect at this time was a terrible one. Icebergs near us, one hundred feet in height, had the spray from the sea thrown over their tops. On approaching the edge of the pack ice we could see a scene of great confusion. The bordering ice would be broken in large pieces, and hurled upon the more solid ice, only to be displaced by fresh pieces torn adrift by the gale, and rolled over and over upon the face of the pack. The fate of the boat and the party appeared certain. We were half buried in the seas at times, shipping quantities of water and deluging everything in the boat. It rained in torrents. Had our sail split or our mast gone, nothing could have been done. Providentially, everything held, and we were enabled to keep the boat under some control. The fog was very thick, making it extremely difficult to see the ice-pack each time until we were fairly alongside of it, in which case we had to wear ship at once without delay, not knowing in so doing whether we could clear this grinding and crushing mass of ice or not.

“This state of affairs continued until ten o'clock on the



THE ADVENTURE IN THE LITTLE JUNIATA

morning of Saturday, August 9th, at which time there came a lull. We had then been in this heavy gale thirty hours, and were in a very cold and exhausted state. Everything was completely saturated with water, and we had so much water in the boat that I feared she had sprung a leak. The Little Juniata behaved wonderfully well, and did more than such a small craft could have been expected to do. With our fire room flooring covered with water, the coal bunkers half full of the same, every locker in the boat afloat, all our bailing must have made little impression on this bulk of water which was constantly increased by the seas shipped at every one of the fearful plunges of the boat and the showers of spray thrown over us.

“We hailed with great relief the lull in the wind which gave promise of a breaking up of the gale, and fearing for the safety of the boat should the wind subside leaving this fearful sea running, we attempted to get a fire lighted under the boiler. This was no easy matter, and for a while seemed impossible. The matches we had taken with us were wet and useless. The tinder was likewise saturated and of no avail. After several hours' work we succeeded in getting a friction match dry enough to ignite, — Ensign May having warmed and dried it by keeping it next his body for that purpose, — and with this match we lighted a candle in a lantern, which was almost immediately extinguished by a gust of wind. By a repetition of the same process Mr. May secured another lighted match, and this time we succeeded in keeping our candle alight. We attempted then to build a fire, but every stick of wood was soaking wet. By taking cotton waste and punk, wet as they were, and pouring oil plentifully over them, we succeeded at last in lighting our fire.

“During this time the wind had moderated and hauled to the S. W. I calculated the boat to have been in lat. $75^{\circ} 48'$ N., long. $68^{\circ} 30'$ W. on the port tack (wind at S. E. true), and long. $67^{\circ} 10'$ N. on the end of each starboard tack. We had been running on a line nearly east and west during the gale, making about twenty-five miles on each tack before wearing ship, and obliged to go over nearly the same ground on ac-

count of icebergs, luffing to the wind as occasion served or required.

“ At this point I was forced to the conclusion that prosecuting the search any longer was out of the question. My orders read positively to return when the fuel was half expended, and on no account to risk the boat in the ice-pack. The fuel was half gone, and what was left was in such a condition as to lead to very grave doubts as to its being reliable for steaming on the return. As far as we could see to the northward and eastward was pack ice, and it was in this direction that our port lay. I did not know how close to the middle pack we had been blown during the gale, and I feared if the wind came out in the N. W. we should not only be blown down upon the Melville Bay pack, but be followed by detached portions of the middle pack, and be caught firmly between the two. Again, if we had succeeded in working our way through a lead in towards the land and had reached it, we had not fuel enough to work our way back through the pack ice, supposing that a N. W. wind had not closed us in for the year.

“ Up to this time we had seen nothing of the *Polaris* or of her people. Had they been at Cape York, it would not have added to their chances of safety had our little party increased their number, with the ice effectually closing our means of exit. Anxious as we were to find them, and tell them of relief coming, I could not further risk our party being caught in the ice in an open boat, with the season closing, new ice forming, and only fuel enough to keep us warm for a few days. I did not know how far the U. S. Steamer *Tigress* was behind us, nor what our chances would have been of her rescuing us, had we been frozen in. The weather was uncertain, another gale like our previous one was by no means unlikely, and my orders expressly forbade me to jeopardize the lives of the party by putting the boat in the pack ice.

“ Reluctantly, therefore, I was compelled to announce that the search must be given up, and headed the boat to the S. E. on our return, having steam enough to go ahead at four P. M. Having gone up on the inshore track, I concluded to return by the offshore, or mid-channel track, in hopes that we might

see something of the *Polaris* or her people, but in this we were not gratified.

“The wind continued hauling to the westward, soon reducing the S. E. swell, and creating a swell from the N. W. Before this we went along at a good rate, the weather clearing gradually, the ice-pack disappearing astern.

“Sunday, August 10th, opened clear and pleasant, so continuing till past meridian. For the first time since leaving the ship I succeeded in getting observations, and established the boat's position at noon, in lat. $74^{\circ} 45'$ N., long. $59^{\circ} 37'$ W., having run nearly one hundred and fifty miles during the preceding twenty-four hours.

“At one P. M. sighted the Devil's Thumb, bearing true N. E. by N., distant about sixty miles, verifying our position at noon with tolerable accuracy. The weather here became cloudy and squally from W. S. W., with snow, hail, and rain. Wind shifting again at four o'clock to S. W., with moderate sea, and so continuing till nine P. M., from which time to midnight we had light, variable airs.

“Monday, August 11th, opened clear and pleasant with freshening breezes from N. E. At four A. M. sighted land on port bow, which I recognized as Cape Shackelton, and at 5.30 A. M. sighted the Duck Islands on port beam. This day and the day previous we had considerable trouble with our fires. Knowing that we were short of fuel, we economized as much as possible, and were sometimes rewarded by the engine stopping itself for want of steam.

“At noon got our latitude by meridian altitude of the sun to be $73^{\circ} 38'$ N., or on the parallel of the Horse's Head, which now showed itself on our port beam. We then headed in for Brown Island off Tessi-Ussak, favored with a fine breeze from N. N. W., with long swell, which led me to think that the weather had been unsettled after our departure from Cape York. At midnight we were inside of Brown Island, heading in for Tessi-Ussak.

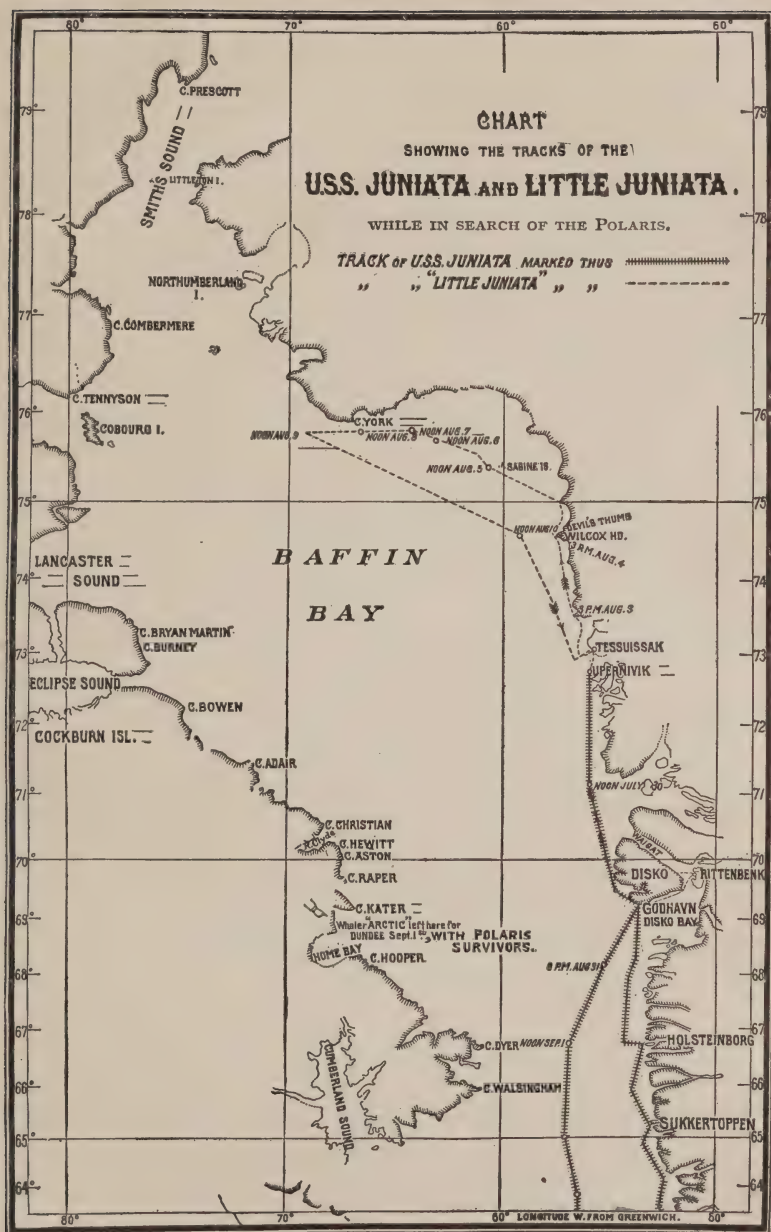
“At one A. M. Tuesday, August 12th, sighted Jensen's house, and discovered a steamer apparently at anchor in the harbor. She immediately thereafter steamed out toward us,

and coming alongside of us proved to be the U. S. Steamer *Tigress*, Commander James A. Greer, from Upernavik the previous evening. I boarded her and communicated to Commander Greer the result of our reconnaissance, imparting to him the circumstances of wind, weather, ice, and other details relating to his coming journey, up to four o'clock on the afternoon of Saturday, August 9th, at which time we left the neighborhood of Cape York. I exhibited to him my chart, showing our track going and returning, reported to him the prevalence of pack and new ice in Allison Bay, and respectfully recommended him to strike to the N. W. from Cape Shackelton, instead of looking for the Devil's Thumb.

"I also offered him the services of our entire party and boat, expressing our willingness and readiness to accompany him to the northward in his search for the *Polaris*, which services, to our great regret, he declined. Receiving from him his mail and despatches for you, I left the *Tigress* at two A. M., she immediately steaming to the westward to round Brown Island, and the *Little Juniata* stood in for her anchorage in front of Jensen's house. The people of the *Tigress* were all well, in good spirits, and enthusiastic as to their success, which we heartily wished them in spite of our own disappointment.

"At 8.40 A. M., having received on board the six hundred pounds of coal, left with Jensen on the 2d, and having received from him some seal blubber in case we ran out of coal, we got our anchor and steamed away, passing among the same islands and through the same channels as in going north, and, favored with fine weather and smooth sea, reached the ship without any mishap at eight P. M. to-day, and were warmly received and welcomed back by you and the other officers assembled at the gangway.

"It now remains for me to hope, in submitting this report to your consideration, that my conduct in the affair will meet with your approbation, and that though we were unsuccessful in the endeavor to find the *Polaris* or her people, no means were left untried that the nature of the difficulties met with and the limited ability of our boat would allow. I believe the *Little Juniata* to have accomplished more than was expected



of her in reaching the parallel of $75^{\circ} 52'$ N., there successfully working through a gale of great violence, and running nearly seven hundred miles while away from the ship. With the limited chances for keeping a reckoning, owing to thick foggy weather, and the constant discomfort of being in wet clothing, with every article in the boat drenched by the rains, or by the waves breaking over her, I fear that this report will not prove as satisfactory for navigation purposes hereafter as would be desired. I have made this report to you in detail, omitting no circumstance, however slight, that a fair, general idea might be obtained of the circumstances of Arctic navigation in an open boat, even at this the most favorable season of the year.

“ Throughout this trip the officers and men worked alike, and fared alike, and as we are unanimous in our regret that as far as finding and relieving the *Polaris* was concerned we failed, we beg to assure you we are of one voice in volunteering for any subsequent expedition from this ship or from the United States, in which our efforts can be made useful, or our experience in the *Little Juniata* of any effect.

“ I cannot close this report without commenting upon the great interest taken in the matter by yourself, the provision made for our comfort, and your thoughtful care that nothing should be wanting to insure our safety and the success of the expedition.

“ I have the honor to be, Captain,

“ Very respectfully, your obedient servant,

“ GEORGE W. DE LONG, *Lieutenant U. S. Navy,*

“ *Late commanding Little Juniata.*”

During the absence of the *Little Juniata*, Captain Braine had met the *Tigress*, and been greatly alarmed by the representations made by the captain and ice-pilot. The Danes and Esquimaux, also, at the settlement, expressed the gravest fears for the safety of Lieutenant De Long and his party, and it was with intense relief that Captain Braine welcomed the *Little*

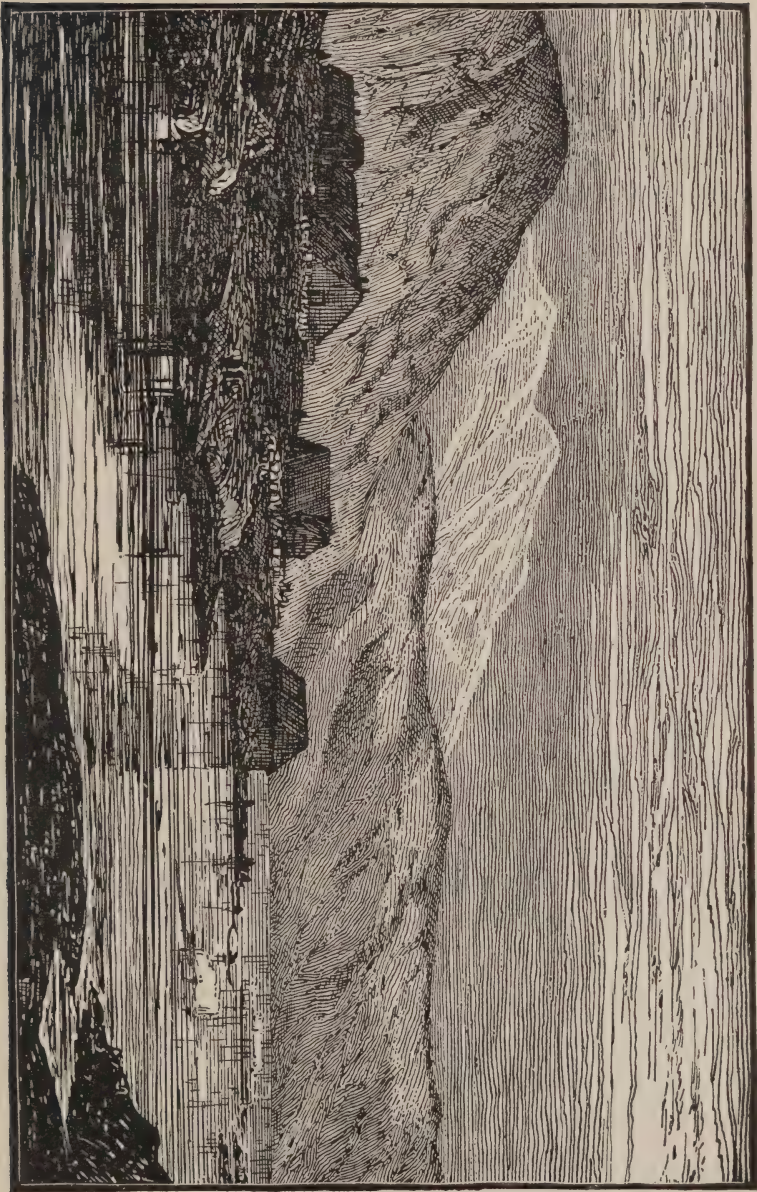
Juniata back. Captain Markham, who was on the last English expedition under Sir George Nares, considered this boat journey as one of the most hazardous and venturesome undertakings he had ever known. Men to save their own lives will take such risks, but they rarely court them to save others. Melville Bay is renowned for its dangers, and whole fleets of whalers have been crushed in the ice which crowds it.

The following letter, which Lieutenant De Long wrote to his wife after the expedition, gives in more familiar form some of the impressions which his experience left upon him.

U. S. S. JUNIATA, GODHAVN, DISCO ISLAND,
GREENLAND, *August 19, 1873.*

I presume there will be no question as to our having tried our best to find the *Polaris*, and as to our having tried every means to accomplish it, but it was a physical impossibility to drive our boat through ice four feet in thickness, and so we were compelled to turn back. I made a long report of the expedition covering twenty-three pages of official paper, and of course I cannot give you such a complete description of it in one letter. However, there were some things which I did not include in my report, and these things I can write you, and you can know they were reserved for your reading first.

In the first place, I am thankful to God for having spared me to come back to you again, for I assure you I felt pretty well convinced on two occasions that I was going to leave the bones of our party in the ice. It was, to say the least of it, a perilous journey, and our experiences of the ten days are things which I shall remember for the rest of my life. There rested on my shoulders the fearful responsibility of saying how far we should go, and how far the lives of our little party were to be jeopardized; and surrounded as we were by dangerous circumstances, I had an amount of care on my mind that I do not desire to have again for such a length of time even as ten days. Our boat, to begin with, was a small one,



UPERNAVIK.

and we were loaded down with coal and what provisions we should require. The great object was to carry coal so that we might be able to steam, and we filled up every available nook and corner with that precious article. We had to sleep upon coal, and that made a hard bed, I assure you; and when you add to that the fact that we were wet to the skin almost from the time of our start, with our blankets soaking always, you can understand that we had very little comfort and less rest. We had eight in our party, and kept watch and watch, of course, and in bad weather all hands had to be around. Cooped up in a small space, there could be no distinction made between officers and men, and we turned in and out with each other.

I cannot give you any very accurate idea of our trip without writing a fearfully long letter, and so I will only refer to the leading incidents. About one hundred and twenty miles to the northward of Upernavik we were caught in the ice. Now, being caught in the ice means starving to death or being frozen to death, if you have to stay there. We got caught in it by accident, for we were following a lead in the ice when a thick fog shut in and new ice commenced forming around us. On attempting to work back the way we had come, we missed our track and were brought up standing. Such a night of anxiety I hope never to have again. We were fast, ice was making around us and thickening all the time; nothing to be seen for miles but ice. Mr. Dodge, who had spent a long time in this part of the world, shook his head rather dubiously. Still, I was not disposed to give up without a fight. We kept ramming the ice all the time, trying to drive through it, running into every little crack we made, grinding and scraping, trying to break through ahead of the boat, so as to make a clearance. Sometimes we would get into a narrow lane of water and run along nicely for a hundred feet or so, and then bang! we were again at a stand-still. This continued for twelve hours, and finally we got clear.

Our next mishap was getting in a gale of wind when about eight miles from Cape York. We had been on the edge of the ice-pack looking for an opening, in a thick fog, when this

gale came on, and for thirty hours we were, without doubt, on the brink of eternity. The boat was nearly all the time buried by the sea, she was half full of water, we were surrounded by icebergs a hundred feet at least in height. The broken pieces of ice were being hurled like stones on the face of this ice-pack and ground to powder, or else thrown over and over like lava from a volcano. Had we struck this ice, our chances would have been slim, — in fact, I would rather have been in the worst surf that exists than have been thrown up against this terrible wall. Looking back at it now makes me tremble, and I can only say that it was a miracle of Divine Providence that we were saved. When the gale broke we were in a pitiable condition — hungry, cold, and wet, not a dry thing in the boat. The ice was all heaped up between us and Cape York, and getting through it was an impossibility. Our coal was nearly all gone, and we had yet to get back to the ship. I had to decide to return, and had we not been favored by a breeze, we would not have reached here yet. As it was, when we met the *Tigress* we were burning pork in the furnace to get into *Tessi-Ussak*.

Captain Braine and all hands seemed overjoyed to get us back. It appeared when the *Tigress* met the *Juniata* at Upernavik, Captain Tyson, who was one of the survivors picked up on the ice-floe, expressed the opinion that we were as good as lost if we met any bad weather, and that set everybody to thinking very seriously how perilous a journey we had undertaken. What the people on board the *Tigress* could not understand was my volunteering for the expedition, and many sad shakes of the head and sayings of "Poor De Long" showed how little they expected to see me back. When the *Juniata* sighted us returning, the ship was wild with excitement, the men manning the rigging and cheering us until we came alongside. When I stepped over the side so buried in furs as to be almost invisible, they made as much fuss over me as if I had risen from the dead, and when the captain shook hands with me, he was trembling from head to foot.

The *Juniata* returned to St. John's, Newfoundland,

without having gained any further intelligence of the *Polaris*, and although it was September, Captain Braine received orders to return to Greenland, on the same errand. The ship had just started when a telegram reached the United States consul, countermanding the *Juniata's* sailing orders, since the *Polaris's* crew had been picked up and rescued by the whaler *Arctic*, Captain Adams, and had been taken to Scotland. The consul hired a tug, steamed after the *Juniata*, overtook her, and communicated the pleasant tidings. The vessel shortly after returned to New York, and Lieutenant De Long wrote to the Department tendering his services in event of another Arctic expedition. His indomitable energy, strong will, and passion for overcoming obstacles, all tended to develop in him that Arctic fever, which so often fastens upon one who has once known the excitement, difficulty, and peril of northern exploration.

The courage and persistence which he showed upon the boat journey were credentials of great value, and the personal attraction which he exerted was to be a powerful aid in overcoming obstacles. These qualities will appear in the fuller narrative of his experience in his great voyage, although, since the narrative is from his own hand, the reader may sometimes fail to measure the degree of his heroism. Something of his power of endurance may be learned from a little incident which befell him a few years after the events just related.

It was when he was executive officer of the School Ship *St. Mary's*, and was working the ship up the Tagus River, Portugal. He was standing on a horse-block (a slight elevation on each side of the deck) when a rope fell from aloft. Fearing it might injure a stand-

ing compass, which it probably would strike on its descent, he sprang to catch it, and instead of alighting on the deck as he expected, he came down on a coil of rope, and turned his right ankle under him. The pain was excruciating, and as he was on the point of fainting, he went below, where the doctor revived him, and he returned again to the deck. It was ten in the morning when the accident occurred, and he stood and worked the ship up the river to Lisbon until four in the afternoon, when his agony became so intense that he was obliged to go below. His duty was done, however. The doctor examined his foot and found it in a dreadful condition. One of the bones of the ankle was broken, and the edges had been grating and breaking for the six hours he had been walking about on it. The hot climate of Lisbon and of the return trip were naturally unfavorable to a rapid recovery, but the perfect health and vigorous constitution, which he had kept unimpaired, were his allies, and he was left with no stiffness of the ankle and no ill effects. He attended to his duty as usual after two weeks' rest, and the carpenter, Nindemann, made for him a pair of crutches, upon which he hobbled about and took his watch as if nothing had happened.

The courage and endurance which he displayed under difficulties and trials were qualities of a nature which was superabundant in joyousness and activity. His adventures at sea and on land were full of incident, and often offered the most amusing situations. While in Lisbon, in 1867, a grand performance at the Opera was to take place. The king and queen, the court, and all the officers off duty of the various fleets lying in the harbor, were in attendance. Between the acts, Mr. De Long and several of his friends were introduced behind

the scenes. Seeing the prima donna come upon the stage from an opposite wing, Mr. De Long picked up a large pasteboard bouquet, which was one of the stage properties, and marshaling his friends in a line behind him, advanced to meet her. She made some motions which he failed to understand, and with his hand upon his heart and his best bow he tendered the gigantic bouquet. Just then a perfect shout went up from the audience, and cries of "De Long! De Long!" were heard. He looked around in bewilderment before he took in the situation. His friends had abandoned him, the curtain had gone up, and he was playing his little piece before the great audience. It is scarcely necessary to add that he made his exit without the slightest ceremony.

Another amusing incident in Lisbon arose out of a wager between Mr. De Long and another officer as to who could do the most with a horse in a circus ring. Neither gentleman was a horseman; what sailor is? but they were equally bold. Their first proposal was to ride standing upon a pad, but the ring-master to whom they applied would not give his consent. He had once granted such a request for a similar purpose, and brought upon himself a severe rebuke when one of the parties, a young German nobleman, was seriously injured. He would give the officers each a saddled horse, and let them test their horsemanship to their hearts' content. So they went through various evolutions equally well, and jumped some low hurdles, but neither could be proved to have outdone the other. Finally the ring-master stepped forward and said: —

"There is but one thing more I can suggest to decide the wager, and that is for each in succession to ride into the stable, take a turn round, come down the

inclined plane, and jump over this five-barred gate into the ring."

This was agreed to. Mr. De Long's companion, being senior in rank, was to make the first attempt. He made his turn of the stable, came down the inclined plane, took the gate, and landed gracefully in the sawdust a few feet in advance of his horse. When Mr. De Long's turn came, he resolved to die or conquer. He rode round the stable, came down the inclined plane at a gallop, tightened his knees against the horse's flanks, and shut his eyes. To use his own words: "When the horse sprang for the leap it seemed as if I had started for the sky. I shut my eyes tight, and my next sensation was that of being struck by an earthquake. When the animal landed in the ring, I was clutching hold of his mane frantically; and when I opened my eyes, I was away up the horse's neck, almost on his ears, but I was there, and the wager was decided in my favor."

In his intercourse with his associates, and especially with the men and boys under his command, he showed an unfailing courtesy and kindness, while he was inexorable in his maintenance of discipline. A slight instance of his kindness is shown in the following incident. One rough, cold and windy October night, he was sailing a boat in Long Island Sound with a crew of St. Mary's boys. Noting that one of them had become wet from salt-water washing over him, Mr. De Long quickly took off his own coat and handed it to the boy, telling him to put it on. The lad hesitated at accepting such a sacrifice from his officer, but the stern command, "Do as you are bid, young man," soon caused the boy to obey.

"I can only say," Mr. De Long once wrote, "that with men I never allow any argument. Were officers

and men to argue each order before carrying it into execution, there would be an end to discipline. I never ask a man to do anything that I would not do myself, and on one occasion I led them aloft when they hesitated to obey an order on the score of danger. With firmness I can yet be kind, and I always had my men contented and comfortable. I have no hesitation in saying that I believe any men who have sailed with me would go willingly again."

One of his associates on the *St. Mary's*, recalling that earlier experience, has written : —

"A few days after the appearance of the newspaper notice of Lieutenant De Long's orders to the New York Nautical School Ship *St. Mary's*, one of the inquisitive marine aspirants remarked to one of his chums, 'I wonder what sort of a chap that fellow De Long is who is coming here?'

"He soon learned that 'that fellow De Long' was a perfect master of the situation, always equal to the various and often trying emergencies at sea and in port. His courtesy to all and interest in the boys took away the hardness of his rigid discipline.

"When questioned by a reporter, 'Are the officers kind to you?' a lad of fifteen replied, 'They are as kind as they can be, and when we were at sea they treated us better than when we were near land. We liked them for that. There's Captain Phythian, and Wadleigh, and De Long, and all of them; they are as nice as they make them.'

"From that estimate to the high tribute which the graduates and members of the Nautical School have recently paid to the memory of De Long, no moment is wanting when he has not been looked up to and honored as a man not only of rare heroism but of eminent fitness for the works he has been selected to perform."

CHAPTER II.

PREPARATIONS FOR THE EXPEDITION.

Conversation with Mr. Grinnell. — Proposal to Mr. Bennett. — Mr. Bennett's Response. — Delay in Plans. — Search for a Suitable Vessel. — Purchase of the Pandora. — Sketch of Operations. — Dr. Petermann's Views. — Lieutenant De Long repairs to England. — Balloon Ascensions. — The Pandora renamed the Jeannette. — Lieutenant Danenhower joins the Ship. — the Voyage to San Francisco. — Action of Congress. — Survey of the Ship. — Interview with Secretary of the Navy. — Alterations of the Jeannette. — Considerations of Economy. — Captain De Long's Labors. — The Officers of the Party. — The Crew. — Advice from Outsiders. — Orders for the Expedition. — Mr. Bennett's Farewell. — Outlook.

WHEN the Juniata was ordered to the coast of Greenland, Lieutenant De Long called upon Mr. Henry Grinnell, of New York, to obtain from him any information which his long connection with Arctic explorations could afford. Mr. Grinnell offered the use of charts which had been employed on the several expeditions he had fitted out, and upon the return of the Juniata Lieutenant De Long restored these charts to Mr. Grinnell, and acquainted him with his own experience. The two held a long talk upon Arctic subjects, and shortly after Lieutenant De Long dined at Mr. Grinnell's in company with Dr. Bessells and other Arctic voyagers. At this dinner Mr. De Long asked Mr. Grinnell: —

“Why do you not fit out an expedition to the North Pole? I should like much to take command of one and solve the problem. You have tried so often you ought to try again.”

“I am too old a man,” replied Mr. Grinnell, “and I have done my share. Younger men must take the matter in hand. There is Mr. James Gordon Bennett. He is the man to undertake such an expedition. You should apply to him.”

It was the first day of November, 1873, when this conversation occurred, and Mr. De Long acted promptly on the hint, and wrote to Mr. Bennett, who was then in Paris. Mr. Bennett had already considered such an expedition, and made a courteous reply, but upon his return to this country early in 1874, a personal interview with his correspondent convinced him at once that the most important element in the expedition, the man to command, was found. Mr. De Long in his letter had named Lieutenant Chipp, his companion on the Little Juniata, as one whom he should like to have associated with him, and from the first Mr. Bennett regarded him as Mr. De Long's right hand man.

The matter rested until near the end of November, 1876. There had been, it will be remembered, some complications with Spain which at one time made war seem possible, and it was inexpedient to consider the expedition under such circumstances. Mr. De Long was detached from the Juniata in January, 1874, and ordered to the Brooklyn, with which he remained till near the end of the year, when he was transferred to the Nautical School Ship St. Mary's, which was commissioned by the United States Navy, but was under the supervision of the Board of Education of New York city.

In November, 1876, Mr. Bennett and Lieutenant De Long resumed their consideration of the expedition, and it was determined to look for a vessel with all possible dispatch, and to start for the North Pole the fol-

lowing summer. Inquiries were made in all available quarters for an American vessel, but none could be found; and in December Lieutenant De Long obtained a two months' leave of absence from the *St. Mary's* and went to England on the same errand. It was expected that Mr. Bennett would join him shortly, but he was detained in America until just before the expiration of Lieutenant De Long's leave of absence, when he joined him in London.

Meanwhile Lieutenant De Long personally, and through confidential agents, was employed in diligent search for a vessel. Special effort was made at the northern ports from which sealers and whalers were sent out, and he was constantly examining such vessels as seemed to give promise of fitness, but the difficulties seemed to increase. Poor vessels were offered at high prices; good ships the owners would not sell, as whalebone was so high that one cruise to the Arctic more than paid the first cost of a vessel. The only suitable one which seemed to be in the market was the *Pandora*, owned by Sir Allen Young who used her as a pleasure yacht in trips to the Arctic regions. Sir Allen was indifferent to the sale, and the purchase had not been effected when Mr. Bennett arrived in London. Mr. Bennett wished Lieutenant De Long to ask an extension of his leave of absence, but this would have worked, at the time, so much injustice to the officers of the *St. Mary's* that Lieutenant De Long refused to make the application and returned to America.

During the season that followed a constant and vigilant watch was kept up, but the *Pandora* continued to be by far the most available vessel. Sir Allen himself was an explorer of note. He was with Admiral McClintock when the first records of the Franklin expedi-



J. B. Bennett

tion were found, and had made a number of subsequent voyages. The Pandora was a vessel in which he took great pride, as he had purchased her expressly for Arctic expeditions, and had tested her well on such voyages. He parted with the vessel to Mr. Bennett under a sudden impulse, and then regretted his loss so keenly that even after the vessel was ready for sea he made ineffectual efforts to recover her.

Lieutenant De Long was attached to the St. Mary's in New York harbor, as executive officer, when he received news of the purchase of the Pandora. He immediately resigned his position and secured a six months' leave of absence. Pending further word from Mr. Bennett, he wrote him at length, January 25, 1878, giving his views of the course to be pursued, and the letter is interesting as showing the comprehensiveness of the plans which he formed and the promptness with which he acted:—

“Since receipt of information on the 17th inst., that you had purchased the Pandora, I have been momentarily expecting a summons to join you in England. Acting upon your notification to get six months' leave immediately, I secured the necessary permission from the Department upon tendering my resignation as executive officer of the St. Mary's. Obtaining a leave of absence for a second time from that vessel was, as I had previously informed you, out of the question. By dint of extraordinary exertion I secured my release within forty-eight hours of my knowing you wished me to get six months' leave, and I have since that time remained with trunks packed ready to sail. . . .

“There are three ways for us to send the expedition, Smith's Sound, Behring Strait and east coast of Greenland. Of the three I am in favor of Behring Strait, though something can be said in behalf of the east coast of Greenland. Professor Nordenskjöld has received some information from

our Hydrographic Office in relation to Behring Strait, and a copy of this information will be furnished us. We may be able to accomplish much by way of Behring Strait by leaving San Francisco as late as July 1st, but I would like to be ready by June 1st or 10th. My opinion may be changed by what you have heard from Dr. Petermann, but as you have not told me what that was I cannot say now.

“Now I wish to submit the following points to you for your action. It is highly important that I should be in England to see the Pandora repaired, and got ready for sea. A small omission now may cost us the success of the expedition in the end. Chipp should be recalled from China by cable at once, and if you think favorably of my suggestions, be ordered to take the Pandora around the Horn. Upon the passage of the bill transferring the ship to the American flag, there should be a measure introduced and put through Congress, authorizing the vessel to be commanded and officered partially or entirely by naval officers, the pennant of a national vessel hoisted at the main, the crew shipped subject to naval rules and discipline, and the President empowered to confer such additional authority upon the commanding officer as will render him able in his isolated position to enforce discipline in extreme emergencies. Then I want an order from the President in something like the following words: ‘You are hereby ordered to command the expedition now being prepared and fitted out by James Gordon Bennett, Esq., of New York, for the purpose of North Polar explorations; and you will report to the Secretary of the Navy for said duty and for such detailed assistance as you require.’

“The assistance of the Treasury Department should be invoked to order its agent in Alaska to provide seal-skin clothing for about thirty-five people, in height from five and a half to six feet, and to secure say forty dogs, and to collect, if possible, about one hundred tons of coal. The use of the San Francisco navy yard and dry dock should be asked for. The memorial to Congress should ask that the different departments of the Government be authorized to aid and assist us in every way; to provide us with all instruments and appurte-

nances, stores and outfits, which might then be in government possession.”

This letter also contained estimates of the expense of the expedition on a three years' cruise.

The reference to Mr. Bennett's correspondence with Dr. Petermann recalls an earlier visit to the German geographer which Mr. Bennett had made in March, 1877, and of which he wrote to Lieutenant De Long:—

“I have just returned from a hurried trip to Gotha, on a visit to Dr. Petermann. You have no doubt heard of him by reputation. It was he who originated the two German Arctic expeditions. I can assure you the three hours I spent with him fully repaid me the tiresome trip to Gotha. He told me he had been studying the North Pole problem for the last thirty years, and that he feels certain it can be reached, but never, he said, by Smith's Sound or Baffin's Bay. He agreed with me that the English held to this route simply from pride, and because they were the first (so to say) to go that way. He also agreed with me, and if I remember correctly, it is your theory also, that the Pole can only be reached by a dash, and he even goes further than we do in this theory, for he says it can be done in one summer, and that with a suitable vessel and commander experienced in ice navigation, he would himself try the experiment for a three months' cruise. Of course, this bars being nipped in the ice, just as his doctorship would be about preparing to return on his homeward voyage. He also said that all the authorities in England agree now that the Pole will never be reached by sledges. Dr. Petermann even goes so far as to say that wintering in the Arctic regions is a mistake if you can in any way help it, and that if his route were taken it could be reached in the three summer months, or not at all. Said he: ‘From all my information, I find that it is the second winter, and not the first, men most suffer in the Arctic regions, and strange as it may appear, men from southern climes, such as Italians or Greeks, have

withstood the rigors of an Arctic winter better than Northmen, such as Danes and Swedes.' I have been seriously thinking of getting another vessel in addition to the one you will have, and starting myself by Dr. Petermann's route. Of course, if I did so I should expect to be out all winter, as I don't quite agree with the Doctor about his three months' idea."

Not long after dispatching his letter Lieutenant De Long crossed to England to superintend the preparation of the Pandora, since renamed the Jeannette, for the Arctic expedition. He visited the yacht at Southampton as soon as he arrived, and after careful examination telegraphed to Mr. Bennett, who was in Leicestershire, that it would be impossible to repair the Jeannette and get her ready for sea early enough to permit the expedition to start that year for the north by Behring Strait, though it would be possible to go either by the Spitzbergen route or by the east coast of Greenland. The Behring Strait route, however, had by this time become firmly fixed in the minds both of Mr. Bennett and of Lieutenant De Long, and it was determined, therefore, to proceed with the repairs of the Jeannette, to send her round the Horn to San Francisco, and be ready to start for the north early in the summer of 1879.

The reasons which determined the course of the exploration, besides the failures from other points, were, in brief, the existence of the Japan current, flowing through Behring Strait to the north, and the supposed extent of Wrangel Land. It was hoped that the warm waters of the current would open a way, possibly to the Pole. The experience of whalers was that whenever they had been obliged to abandon their vessels in those regions, the vessels had been drifted northward, and the inference was that the currents generally

flowed in that direction. This would help explorers to make a high latitude, though it would, for the same reason, increase the difficulties of return. On the supposition that Wrangel Land, now known to be a small island, was a vast continental tract, it was expected that the Jeannette, in accordance with settled principles of Polar exploration, would follow its coast line to the north. When the vessel could work no further, sledge expeditions were to start out along the ice-foot to make a still higher latitude. Dr. Petermann, indeed, supposed Wrangel Land to stretch across the Pole and to reappear as Greenland of the Western continent. Added to these considerations was the comparative novelty of this course, which would render the expedition fruitful in observation and discovery, even if it failed of its main object.

Among the schemes which were brought forward in connection with this, as with other Arctic expeditions, was that of balloon ascensions, and though in the imperfect state of the aeronautic art, even under the best conditions, there seemed to be little chance of any practicable use of balloons in the Polar regions, both Mr. Bennett and Lieutenant De Long made the most careful and thorough examination of the subject before finally relinquishing the scheme. Mr. Bennett's secretary in England, writing to Lieutenant De Long on the subject, says : —

“ I have written to Paris to inquire concerning the balloon material, etc., as you request. Markham and Hull were not much inclined to put any faith in balloons. Markham said he would consider an exploration by that method as simple madness, as the balloonist would be unable to carry with him the means of returning, and would be certain to perish before he could get back. As a means of making observations from a

height above the vessel or its vicinity, he thought a captive balloon might be useful if not too difficult to carry and inflate. He did not think it would be of the slightest service in sledging."

In response to the inquiry made in Paris, a report was obtained from the eminent French aeronaut, M. Wilfrid de Fonvielle, as to the best manner of preparing balloons for use in the Polar regions; and as a contribution to science, a translation of the report is printed in Appendix A.

The subject had first been broached by Lieutenant De Long to Mr. Bennett, and upon receiving the above he replied: "In writing to you on the subject of balloons I did not intend to convey the impression that I favored balloons as a means of getting to the Pole. I believe in them for but one object, and that is to get an increased height above a ship to command a larger horizon. A favorable occasion may be waited for, and one ascension may save many days' weary work in a wrong direction." He wrote also to Mr. Samuel A. King, the aeronaut: "Will you be kind enough to take into consideration the subject of an Arctic balloon? I desire, if possible, to employ a balloon (with a rope attaching it to the ship) for the purpose of commanding a greater view in order to select water channels for my vessel; and to have the lifting power applied to sledges and their loads to lessen the difficulty of dragging them over floes and hummocks." The result of inquiries is contained in a subsequent letter from Lieutenant De Long to Mr. Bennett: —

"I have had a long and interesting interview with Professor King, the 'balloonist,' and I am forced to the conclusion that we cannot do anything with balloons in Arctic explorations. To support a weight of one hundred and eighty pounds human

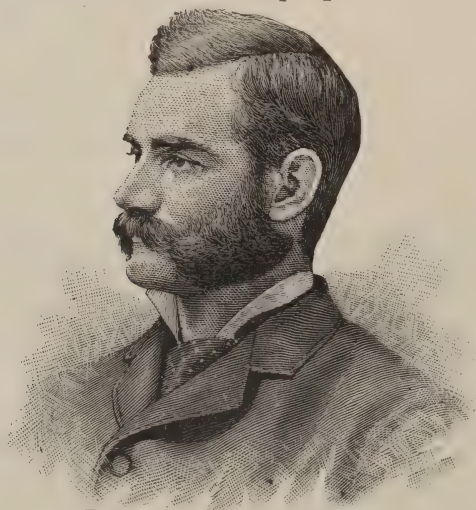
flesh (my own weight), and say seventy pounds rope, at a height of one hundred and fifty feet, would require a balloon about twenty-two feet in diameter, according to Professor King. To fill this enormous machine requires gas generated from coal, or gas generated from the action of sulphuric acid on iron cuttings: in the first manner we should require a coal mine near at hand, and in the second manner we should need another ship to carry the sulphuric acid and iron cuttings. The second plan is of course impracticable, and the first would come in merely in case we strike a vein of coal in Kellett (or Wrangel) Land. The cost of a balloon would be between seven hundred and eight hundred dollars, and under the circumstances I cannot recommend you to adopt it on either the score of usefulness or economy. While we were digging out coal enough to float the balloon, we might advance twenty-five miles with sledges, or afoot, and reach the extreme horizon to be seen from the prospective elevation."

No incidental interests of this kind could compare with the importance attaching to the condition of the *Jeannette* herself, and the commander was unremitting in his attention to the preparations made in the spring and early summer of 1878, when the vessel lay in the shipyard at Deptford. Everything was done which his own experience and that of professional surveyors could suggest for the repair and strengthening of a vessel already well built and equipped for Arctic voyages.

The *Jeannette* was finally ready for sea, and was taken to Cowes, where she shipped her crew and then crossed the channel to Havre, where she arrived June 18, 1878. She lay at Havre for a month, during which time she was inspected by many visitors, and the commander completed his equipment of charts, books, and stores. On the 4th of July the vessel was formally christened. Mr. Bennett sailed for New York on the

6th, and the Jeannette accompanied him a short distance on his way and then returned to the basin, leaving Havre for San Francisco July 15, 1878.

Captain De Long was in command, and had with him his wife and child. Master John W. Danenhower went with him as executive officer. He had been attached to the U. S. Steamer Vandalia, which was conveying General Grant and his party from port to port in the Mediterranean. The Vandalia was stationed at Smyrna when the news came of the proposed expedition, and



John W. Danenhower

Mr. Danenhower offered his services to Mr. Bennett. General Grant seconded his application, and Mr. Bennett accepted him, provided Captain De Long should give his consent, which he did. Mr. Danenhower was detached from the Vandalia and joined Captain De Long in Havre just before the Jeannette sailed.

Two of the ship's company, John Cole, boatswain,

and Alfred Sweetman, carpenter, were also of the number who went to the north. They had served on Mr. Bennett's yachts, and the former especially received the highest praise from him. "You will find Jack Cole," he writes, "one of the best sailors you ever have had under you. In times of danger he's worth his weight in gold, and his tact with men is wonderful."

The voyage to San Francisco was a hundred and sixty-five days, and during the passage not one from the ship set foot ashore, though the *Jeannette* anchored three times in different bays of the Straits of Magellan. One little incident of the voyage may be recorded. When off the coast of Brazil, and a hundred miles from any land, two little birds flew on board the ship to rest; one was a tomtit and the other a field lark. They had evidently been blown off shore by a gale of wind. They showed no fear but refused to eat anything, though everything in the shape of grain which the ship contained was offered to them, and even some lively cheese, which might be a special inducement to insectivorous birds. They would take no nourishment at all, and the tomtit died of hunger and exhaustion. The steward, a Swiss, composed some verses upon his melancholy fate, and these, with the latitude and longitude, were put with the little tomtit into a bottle, which was addressed inside to the "New York Herald" and thrown overboard. It has not yet reached its destination. The field lark flew out of the cabin door, left open by accident, and could not be recovered. It flew off the ship and then made successive efforts to return, but its strength gave out and it sank at last into the water.

The voyage was a stormy one, and when nearing San Francisco the ship encountered a norther which

kept her from making port, as had been hoped, on Christmas. Two days later, December 27, 1878, the Jeannette shackled to a buoy at the Mare Island navy yard, in the bay of San Francisco, with just one bucketful of coal left on board.

A month later a bill was introduced into Congress which provided: "That the Secretary of the Navy be, and he is hereby, authorized to accept and take charge of, for the use of a North Polar Expedition by way of Behring Strait, the ship Jeannette, owned by James Gordon Bennett, and by him devoted to this purpose; that he may use, in fitting her for her voyage of exploration, any material he may have on hand proper for the purposes of an Arctic voyage; and that he is further authorized to enlist the necessary crew for the said vessel for 'special service,' their pay to be temporarily met from the pay of the navy, and to be paid or refunded by James Gordon Bennett to the Navy Department, under the order of the Secretary of the Navy and as he may require; the vessel to proceed on her voyage of exploration under the orders and instructions of the Navy Department; that the men so 'specially enlisted' as above shall be subject in all respects to the Articles of War and Navy Regulations and Discipline; and that all parts of the act approved March 18, 1878 [which gave authority to the Secretary to issue an American register and detail officers], inconsistent with the above, be and they are hereby repealed: provided that the Government of the United States is not to be held liable for any expenditure assumed, or to be incurred on account of said expedition." The terms of the act gave rise to some incidental questions regarding the material which the Secretary might employ, but in the main it was clearly

understood that Mr. Bennett was to meet all expenses, while the Government was to have all the authority.

Captain De Long was thus acting under the direction of the Secretary, while he was also Mr. Bennett's financial agent, and the situation called for the constant exercise of judgment, that the expedition might neither fail of anything that should make its equipment complete, nor be a source of needless expense to the generous patron. From the day when the *Jeannette* dropped anchor in the bay of San Francisco till the day, six months later, when she weighed anchor for her final voyage, the commander's care was incessant. His watchfulness was comprehensive and minute; no detail escaped him, and he laid his plans broadly and firmly. He had constant need to exercise tact and persistence, and devoted himself unweariedly to secure the best interests of the expedition.

His first concern was to see that the ship was in the best condition for the voyage. The Department had ordered an examination of the *Jeannette* by a Board of Survey, and on the 24th of January Captain De Long wrote a full report of their proceedings to Mr. Bennett, and added the result of his own careful and minute examination. His intimate knowledge of the ship, as she was when she left the hands of her former owner, and his acquaintance with the improvements then made, followed by his experience in bringing her round to San Francisco, enabled him to understand thoroughly what further was necessary to make her ready for her northern voyage. The final decision as to her outfit rested with the Secretary of the Navy, and Captain De Long suggested, therefore, that it would be expedient for him to consult with him before the final orders were given. He was accordingly ordered

to Washington by the Secretary, and the result of their conference appeared in a letter which Captain De Long wrote to Mr. Bennett from Washington, February 20, 1879.

“When the request was made to the Secretary to send for me to confer with him, he lost no time in doing so. I reached Washington on the 15th, and had a short interview with him on that date, and a long one on the 19th. Nothing could exceed the pleasure of my reception on both occasions. He expressed himself as personally and officially interested in the success of the expedition, and indicated his conviction that we had struck the gateway to the Pole. He assured me that as soon as the bill now before Congress should pass, authorizing him to assume charge of the expedition, nothing should be left undone which we desired to be done. Said he in substance: ‘As soon as the bill passes I shall order you officially to the command, and then you shall have just what you want in your own fashion, shall have just as much and just as little work done as you desire, shall get what men you want, how and where you please, shall equip and prepare your expedition after your own designs, and shall, in fine, have all the aid the Navy Department can give you. When you sail I intend you to have the same power that is conferred upon admirals commanding fleets, with the addition of being absolute in your command and authority, holding your subordinates accountable to you, and yourself accountable to me. This expedition must succeed, and you shall be prepared and forearmed against all disaffection, insubordination, and disaster.’

“Surely nothing finer than this can be asked. The bill provides for using any material now on hand at the disposal of the Department.”

It may be added to this that the Secretary’s good will was doubtless reinforced by the contagious earnestness of his visitor. Secretary Thompson has since said, in a speech delivered at the Melville-Berry reception at the National Capital, September 23, 1882: —

“Mr. Bennett early suggested and urged on the Department that Lieutenant De Long should be assigned to the command of the expedition. The Navy Department would have been justified in not making the appointment, unless assured that De Long possessed the other qualifications, aside from professional ability, necessary to the discharge of such a duty. As regarded his professional skill, his brother officers in the navy bore universal attestation to that, and the Department was aware that in this respect he possessed all that was necessary. It did not take many interviews with De Long to tell that he was a man of courage, devotion, judgment, and will, and possessed all the qualities which fitted him for this duty. The other selections were necessarily made as the result of conferences with him, and the Department was more or less in a position to be guided by his views.”

Captain De Long had a magnetic power which made him singularly successful in dealing with men and in carrying out the purposes which he conceived. He was always scrupulously considerate of the rights and privileges of others, and exceedingly careful of the personal relations which he held toward them. While absent in the east he wrote to Master Danenhower, who had been sent forward to Mare Island navy yard, where the *Jeannette* was being strengthened, and after detailing the nature of the work which had been ordered, concluded: —

“The foregoing will give you a general idea of the work already begun, and as likely to be in hand during your presence at Mare Island before my arrival. It is decided by the Secretary of the Navy that all materials are to be given by the yard, and merely the labor paid for. It is therefore necessary that we should so act that the cost of labor should not be alarming. . . . The labor being paid for by Mr. Bennett needs great consideration by us. . . .

“Upon your arrival at Mare Island, you will of course re-

port to the commandant, and in as delicate a manner as possible represent to him that you are come to aid in the work to be done on board the vessel, and to act in providing the money to be paid by Mr. Bennett for labor; and request his permission to ask the coöperation of the constructor, chief engineer, and equipment officer, in every way which may present itself for saving money. Then wait upon the three last named gentlemen and ask to be permitted to look at and after any work which may be going on, not as an interference with them, but as one going on the expedition, acquainted with the ship, knowing my views and desirous of giving information on various subjects, and with time enough to go into various small details, which they, in their great occupations with more important things, would not care to be bothered with, etc. Request also that they would indicate to you such methods of procedure as seem right and proper to carry out our views without infringing upon any etiquette whatever.

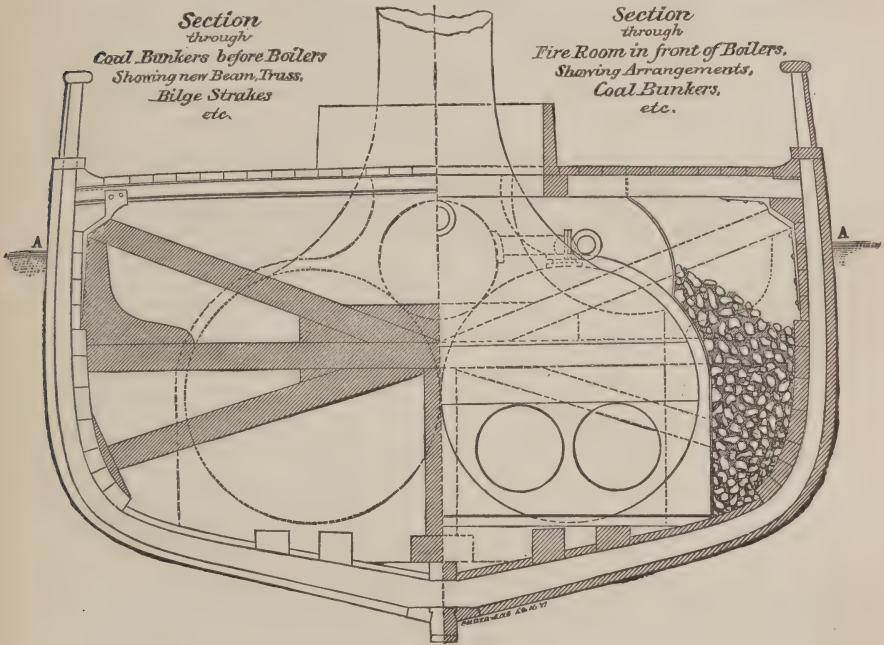
“As the work designated has been ordered done through the commandant by the various chiefs of bureaux, the laborers and workmen will, of course, be hired by the navy yard authorities. But should it seem to you that too many men are employed, or that any man so employed is idling his time, a proper representation to the head of the Department will no doubt have the necessary effect. This is a delicate affair, which I must leave to your tact and discretion, advising you simply that there can be no impropriety in any one’s wishing to save money, and I do not see how it can be objected to. . . .

“I will now leave the matter in your hands, asking you to use your best tact and discretion to accomplish my wishes in a smooth way and to the benefit of the expedition. We are all interested in making the expense as small as possible, both to the Government and to Mr. Bennett, and there are many ways in which this can be done. The earnest coöperation of Mr. Fletcher and Mr. Much [officers connected with the yard] is promised, and they may point out to you many little economical plans.”

How strongly Captain De Long felt the force of these instructions to Master Danenhower appears fur-

ther from a letter which he sent to Mr. Bennett at the same time, in which he writes:—

“Mr. Danenhower has started for San Francisco. I have given him the fullest directions as to his course of action, impressing upon him that the object of his stay there is to save as much money as possible. If I can have a copy made in



CROSS-SECTION OF THE JEANNETTE.

The water-line is at A.

time for this mail, I shall send you his instructions in detail for your inspection and I hope approval. It is not necessary, perhaps, for me at this moment to assure you that I consider your interest identical with my own, and that I am laboring to keep down expenses with as much zeal as if I were to foot the bills instead of you.”

Again, a month later, when writing to Master Danenhower, he urged the same plea: “Will you and

Chipp take the matter of stripping the ship into advisement, and let me know your opinion with figures. It is such little items as three hundred dollars here and five hundred dollars there that run away with the money, and I am more careful about spending money belonging to Mr. Bennett than if it were my own."

The general result of the work done upon the ship is thus summed up in a letter to Mr. Bennett, written in the hard-earned leisure which came after the *Jeannette* left San Francisco : —

"Let me go back a little to tell you what had been done to the ship, and how I found things working at the navy yard when I reached it on the 30th of May. The repairs, or rather the alterations, were completed and the new boilers were in place. The bow had been filled in solid for a distance of ten feet from the stem, and for forty feet in length, and eight feet in depth amidships; the inside had been ceiled with oak planks six inches thick. Exactly amidships a very heavy system of kneed braces had been placed. An entirely new deck had been laid in place of so much of the old deck as was necessarily removed to hoist out the old sixteen foot boilers. The ship had been docked, caulked, and painted.¹ The house for the

¹ In another account of the work done to the ship, especially as regards its strengthening, Captain De Long adds: "A steam-winch has been placed on deck forward of the smoke-stack, capable of lifting the screw, unshipping the rudder, and warping the ship ahead. The bow has been heavily strengthened with oaken breast-hooks and transverse beams, and has been filled in solid and caulked below the berth deck for a distance of ten feet from the stem. Outside we have, of course, the original doubling of three and a half inch American elm extending fore and aft, and down to the floor heads, a distance of four feet nine inches from the keel. In the spaces occupied by the engines, boilers, and coal bunkers, for a distance of forty feet in length, and extending from the spar-deck shelf to the bilge strakes on either side, the old ceiling and wooden trusses have been removed, and six inch planks of Oregon pine in single lengths, with proper shifts, have been substituted. Just forward of the boilers there is a series of beams and braces to guard against dangers from severe nips, while the shape of the hull with its great dead-rise will serve to aid the ship in rising to pressure. The thickness of the vessel amidships is nineteen and a half inches. The frames are on an average twelve inches apart from centre to centre."

crew to live in in winter had been built, fitted in place, and taken apart and piled up. A portable observatory had been made, and winter porches for the cabin doors. New sails throughout had been cut and fitted, as well as an entire outfit of running rigging. Coal bunkers had been enlarged and new ones added, making her bunker capacity one hundred and thirty-two tons instead of eighty-nine tons as formerly. The new boilers were in place and connected. The machinery had been well overhauled; new pumps added; four new propeller blades cast, giving us at starting six blades, or the equivalent of three propellers; and an entire outfit of engineers' tools and stores placed on board. Chronometers, sextants, compasses, and charts were given; Remington rifles, revolvers, and ammunition were added; all the rope, canvas, and boatswain's stores were freely furnished; and, finally, all the carpenters' tools and outfit were thrown in. Everything that the navy yard had on hand was placed at our disposal, and the only things that I added to what had been already supplied were a new galley, navy pattern, bunks in the forecabin for the crew, and covering the inside of the forecabin and ward-room with felt. . . .

“Finally, however, all work came to an end, and the ship was turned over to me. I am perfectly satisfied with her. She is everything I want for the expedition, but a little small for all I want to carry in her. We must remember, however, we are making her do the work of an expedition that has heretofore generally required two ships. We have every appliance for all kinds of scientific experiments. Our outfit is simply perfect, whether for ice navigation, astronomical work, magnetic work, gravity experiments, or collections of Natural History. We have a good crew, good food, and a good ship, and I think we have the right kind of stuff to dare all that man can do.”

The preparation of the *Jeannette* was under the supervision of Lieutenant Chipp and Master Danenhower. Captain De Long left San Francisco for Washington early in February, as we have seen, and did not return until the end of May. During that time he was ac-

tively employed in the countless details of his work. He was in constant communication with his officers at San Francisco, with the Department at Washington, and with Mr. Bennett in Europe. He followed every step of the work on the ship, using the greatest tact in removing the obstacles, some of them very serious, which frequently arose; he made the arrangements for the ship's stores and their transportation; he arranged for the choice of officers and other members of the expedition, and gave close attention to the selection of instruments for use in the scientific observations, and answered good-naturedly and promptly the numberless applications and inquiries which were made.

The choice of his companions was a matter of the greatest moment, and he was fortunate in having his wishes deferred to by the Government and by Mr. Bennett, who absolutely refused to make any appointment for friendship's sake, and supported Captain De Long in his determination to confine the party to those who were qualified for the arduous work of the enterprise. We have already spoken of Lieutenant Chipp and Master Danenhower. The friendship which sprang up between Captain De Long and Lieutenant Chipp during the boat expedition of 1873 was never interrupted; and the very earliest hopes which Captain De Long had of the Jeannette expedition were shared with his old comrade, who was then stationed in the Ashuelot at Fuh Chau, China, from which place he wrote June 21, 1877: "Many thanks for your assurance that if the expedition goes I shall go with it, and I will keep myself prepared at all times to join you upon the shortest notice. I regret that we have been disappointed in getting away this summer, but I sincerely trust we shall be more fortunate in 1878." He made his way to San

Francisco, as soon as he was detached from the squadron in the spring of 1879, and was cordially welcomed by Captain De Long, who wrote him from Washington, April 21, 1879:—

“I have not been able to write you sooner to say how glad I am to know that you are safely in San Francisco ready to join me in our Arctic work. You have, of course, learned from Danenhower the story of the expedition as far as it has got, and you cannot learn more of what I propose to do than by

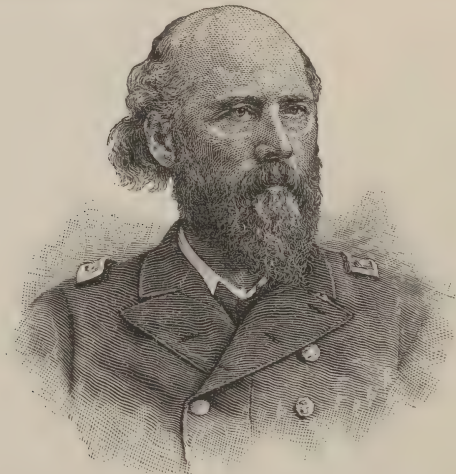


J. M. AMBLER, M. D.

reading my instructions to Danenhower, and my letters to him since his arrival. Of course, as soon as the orders reach you, you will be the senior officer present at the ship, and the head of all operations until my arrival, which will be about May 15th. In order to keep things as simple and regular as possible, I would suggest and request that you leave in Danenhower's hands the completion of whatever work he has begun; and advise and direct him as to the best way to successfully carry out our plans. Melville goes out with all the latest details from the engineer-in-chief, and you and he will easily work together. We are so crowded with work that I cannot find time to go into details a second time, and so I ask that we

all confer and work together, comparing notes, one with the other. We are all working for a common good, the success of the expedition, and we must not stand on a little ceremony."

Passed Assistant Engineer George W. Melville was the chief engineer. He had been a comrade of Captain De Long's on the Lancaster, and was his first choice for the position which he filled. So highly was he regarded in the navy, that the Department was very reluctant to attach him to the Jeannette, from a sense of the extreme difficulty of supplying his place during



GEORGE W. MELVILLE, CHIEF ENGINEER U. S. N.

his absence. The surgeon was Passed Assistant Surgeon James M. Ambler. This post was one of great importance, and the duty of filling it suitably caused Captain De Long great concern. He was unwearied in his efforts to secure an officer who should combine the necessary qualifications, and at one time was strongly moved to invite two surgeons. Something of his concern, and something also of his appreciation, of Dr. Ambler's high qualities may be seen from a letter which he addressed to an applicant for the position in explanation of his course of action :—

“I owe and tender you an apology for my long silence, especially since you have written me your letter of March 24th. As you will be aware probably on the receipt of this letter, Passed Assistant Surgeon Ambler has been ordered to duty in the Jeannette.

“I beg to assure you that this is intended to be no reflection upon you, or disregard of your earnest desire and application to form one of the Arctic Expedition. The limited space for officers' accommodation on board the vessel has convinced me that it may not be possible to carry more than one medical officer. In this case it becomes imperatively necessary that the one medical officer so selected should combine a thorough knowledge of his profession (which you undoubtedly have) with a considerable experience of ships and sailors (which your short time in the service makes it no discredit to say you have not).

“Consultation with eminent medical officers in the navy has impressed me with the conviction that the combination above mentioned can be found best in the list of passed assistant surgeons, and I have caused the position to be tendered, through the Bureau of Medicine and Surgery, to Dr. Ambler, who has signified his acceptance.

“You will, I hope, understand and appreciate my motive. I am placed in a position of peculiarly grave responsibility. With all the respect which I have for you professionally, and the regard which I feel for you personally, I hesitated to invite you to become the only medical officer of the expedition, simply because your experience of ships and sailors is not as great as seems requisite in an undertaking of this kind.

“If, however, I find that there will be room for a second medical officer, that it will be wise to have one, and that you are still willing to go, be assured I will gladly tender you the place. I cannot forget and will not forget that you were the first surgeon to volunteer for the Arctic Expedition (and, until the present writing, the only surgeon to volunteer), and that you have showed a zeal and persistence under trying circumstances of watching and waiting too valuable to be lightly disregarded.”

The ice-pilot was William Dunbar, of New London, Connecticut, who had been master of whaleships in and north of Behring Strait. The meteorologist was Jerome J. Collins, from the staff of the "New York Herald," a gentleman who at once commended himself to Captain De Long by his intelligent zeal, and his determination both to secure all proper equipment and to qualify himself for his special duties. In a letter



JEROME J. COLLINS.

written March 25, 1879, to Mr. Bennett, Captain De Long gave hearty testimony to the worth of his associate: —

“I am very much pleased with him. He has a large fund of general information, and will make a name for himself in the Arctic, I am sure. He has seemingly mastered photography already. I propose now to have him go to Washington, and I shall ask Professor Baird to give him the same facilities at the Smithsonian as were tendered to the medical officer when he should be selected. I shall make the same request of Admiral John Rodgers at the Observatory, and of Captain

Patterson at the Coast Survey Office, and by these hope to secure for Mr. Collins all the benefit of government institutions."

From that time forward Captain De Long and Mr. Collins worked together indefatigably to secure the scientific objects of the expedition.

The naturalist was Mr. Raymond L. Newcomb, of Salem, Mass. In the case of these last named members of the expedition a slight technical difficulty arose, as will be seen by the following letter from the Secretary of the Navy to Captain De Long, dated May 26, 1879:—

"Your letter of the 18th inst., requesting permission to appoint a meteorologist, naturalist, and ice-pilot, to accompany you on the proposed Arctic Expedition, is received. In reply you are informed that I do not think I have any authority to make these appointments, as they are civil and in no sense naval. The law gives me power to detail officers and enlist seamen. They are neither. If you choose to take them with you, all that I can do will be to give my consent, which I will do at any time. If they were mustered as seamen perhaps the object would be accomplished. It would, at all events, subject them to discipline." (See Appendix B.)

This course was followed, and they signed the papers and appeared on the roll as seamen, but the relation in which the meteorologist and naturalist stood to the officers is clearly set forth in Captain De Long's letter of explanation to Professor Baird of the Smithsonian Institution, in which he says:—

"The Secretary replied (to my application) that he had no authority to appoint these gentlemen under an Act of Congress, and suggested that, in order to bring them under naval regulations, I should ship them as seamen. This I have proposed to Mr. Newcomb purely as a matter of form, and he makes no objection. You will understand that in no other

sense will he be considered a seaman, but will be known and published as the 'Naturalist of the Arctic Expedition,' will reside and mess with the officers of the ship, and be one of my official family."

The crew was selected with great care, part in the East and part from the Pacific Coast.

"If I can get suitable men in San Francisco," Captain De Long writes to Lieutenant Chipp, to whom he had specially committed this matter, "I don't want to go to the expense of sending men from the East where I can get them in swarms. Requirements for crew: Single men; perfect health; considerable strength; perfect temperance; cheerfulness; ability to read and write English; prime seamen of course. A musician, if possible. Norwegians, Swedes, and Danes preferred. Avoid English, Scotch, and Irish. Refuse point blank French, Italians, and Spaniards. The steward must be A 1, and not necessarily a seaman. The cook must be a good cook, since he cooks for all hands. Look among recruits in receiving ship to begin with. Pay to be navy pay. Absolute and unhesitating obedience to every order, no matter what it may be. . . . Excuse my scratchy and jerky way of putting things, but I am wofully hurried." (See Appendix C.)

Lieutenant Chipp found it no easy matter to secure men, but Captain De Long received abundant applications from all quarters from persons who wished to join the expedition in some other capacity than that of common seamen. One determined young man, or rather boy, besieged him with letters, professing his readiness to do anything and everything if he might only be taken, and resting his special claims upon an ability to edit a newspaper and get up a variety show for the entertainment of the company during the long nights of an Arctic winter. Captain De Long's reply to his application was in substance that which he made to every one: "Your various letters have been re-

ceived. In reply I would state that I have room in the Jeannette for nobody but her officers and crew. These must be seamen or people with some claim to scientific usefulness, and from your letters I fail to learn that you may be classed with either party."

Mr. Bennett and Captain De Long received frequent advice and warnings with regard to the expedition.



Raymond S. Newcomb

One theorist wrote solemnly that the explorers were on the verge of a great discovery before which the discovery of America by Columbus would pale, for they were to enter a region, about the 87th degree of latitude, where a tropical heat would meet them issuing from the hollow centre of the earth. Another was convinced of the feasibility of opening trans-oceanic communication for commercial purposes between the Pacific Coast and England *via* Behring Strait, the Arctic Ocean, Melville, Lancaster, and Davis Straits, and

Baffin's Bay. He thought the route would be an excellent one for a large freight business during the summer, and only required to be well surveyed and supplied with buoys and light-houses. A well-wisher of the expedition disclosed the valuable properties of cat-tails, which, when packed as a wadding between two cloths, made the most perfect non-conductor of heat possible.

A light-hearted friend of Captain De Long, and former messmate, had only one request to make, that the captain would carry a flute, very precious to the owner, as far as he should go. It was a flute, as the owner wrote, which, in the hands of Captain De Long, had once given exquisite gratification. "I am sure," he adds, "it only requires another course under you to become one of the most remarkable of instruments. If you play it anywhere near Ounalaska's shore, I am sure the wolves will all come down to howl, and thereby serve a good purpose if it should happen to be thick weather. Then, in the periods when the spirits of your men need rousing, what would be more appropriate than for their commander to appear at the mast and discourse those selections from 'Pinafore' upon the instrument of which he is a master?" Still another sent the captain a likeness of Captain Hall and a bit of the Polaris' flag to be carried to the North Pole.

The Jeannette was put in commission June 28, 1879, when the silk flag which his wife had made for Captain De Long was used. This flag was to be used in taking possession of any new found land in the name of the United States, and to be unfurled when the highest latitude was reached. The orders for the expedition were given by the Secretary of the Navy in a letter dated Washington, June 18, 1879, which, after reciting

the terms of the two Acts of March 18, 1878, and February 27, 1879, proceeds:—

“Under the authority conferred by these Acts of Congress, the *Jeannette* has been accepted, fitted out, officered, and manned under the orders of this Department, and you have been ordered to the command of the voyage of exploration.

“As soon as the *Jeannette*, under your command, is in all respects ready for sea, you will proceed with her to Behring Strait, to execute the important and hazardous service intrusted to you. In the execution of this service, the Department must leave the details to your experience, discretion, and judgment. It has full confidence in your ability in all matters connected with the safety and discipline of the ship, the health and comfort of the officers and crew, and the faithful prosecution of the object of the voyage.

“On reaching Behring Strait, you will make diligent inquiry at such points where you deem it likely that information can be obtained concerning the fate of Professor Nordenskjöld, as the Department has been unable to have positive confirmation of the reports of his safety. If you have good and sufficient reasons for believing that he is safe, you will proceed on your voyage toward the North Pole. If otherwise, you will pursue such course as, in your judgment, is necessary for his aid and relief.

“You will, as opportunity offers, advise the Department of your whereabouts, and of such matters of interest connected with the voyage as you may desire to communicate. Wishing you a prosperous voyage, and commending you, the officers and crew, and the object of your expedition, to the protecting care of Almighty God,

“I am very respectfully yours,

“R. W. THOMPSON,

“*Secretary of the Navy.*”

It was a severe disappointment to Captain De Long that the founder of the expedition was not to be in San Francisco to bid him God-speed. In the connection

between the two men there had been no jar or misunderstanding. On the one hand there had been the utmost liberality and confidence; on the other, the closest fidelity. As the time drew near for the expedition to start, and Captain De Long tried in vain to secure from Government a convoy to Behring Strait, he burst out in one of his despatches to Mr. Bennett's representative in New York: "Thank God, I have a man at my back to see me through when countries fail!" Mr. Ben-



WILLIAM DUNBAR.

nett's final instructions, sent by Atlantic cable from Europe and forwarded to Captain De Long, closed with these words: —

"Regret exceedingly I cannot be there to bid him God-speed, but hope to be on hand to congratulate him upon successful return. Tell him I have greatest confidence in his energy and pluck, and I thank him sincerely for his fidelity to me. Say, also, he may push forward to north next spring with perfect confidence, for if ice-bound, I shall spare neither money nor influence to follow him up and send assistance next year, so neither he nor his men will be in danger. I wish this to be

an American success. Tell him in case he returns next year unsuccessful, which I don't believe possible, I shall most certainly send another expedition following year, and continue doing so until successful, but had rather victory should be his than another's. Should De Long not return next year, or in fact never, the widows of men belonging to expedition will be protected by me. Should like him to tell this to his men upon their departure."

In the preparation for the expedition Captain De Long had drawn upon his own experience, and had applied a knowledge derived from long and close study of the details of previous Arctic voyages. His familiarity with naval duty was supplemented by an acquaintance with all the minutiae of the expedition which he commanded. He had been generously supported by Mr. Bennett, and he had the authority of the Government behind him. His survey of the *Jeannette* and her equipment had left him satisfied with the result of the year's work; he had confidence in his associates. His only regret was that Mr. Bennett could not wish them God-speed in person, and that Government had failed to furnish him with a steamer to carry additional supplies to St. Michael's, for this failure would inevitably delay his final entrance into the Arctic Ocean.

Yet the completest preparation for the expedition was in Captain De Long himself. The sketch of his early career, and the glimpses of his character which this chapter has afforded, will give the reader some intimation of the singular qualifications which Captain De Long possessed for the work which he had undertaken. For years his mind had been turning to this point. His native enthusiasm and spirit had urged him, and his sense of a great work to be done had drawn him forward. The experience which he had known when in

command of the Little Juniata had given him a practical knowledge of some of the difficulties attendant upon Arctic exploration, and had assured him that he was not wanting in the qualities of an explorer. The more he pondered upon the problem of the North Pole, the greater became his desire to help in its solution, and if possible to give that answer which alone would satisfy the world. He was keyed to the temper of his great enterprise by no vainglorious purpose or rash self-confidence. He never disguised from himself the seriousness of the task he had essayed, nor imagined that he was to win a high reputation by some happy turn of fortune. He belonged to the men who have cared for great things, not to bring themselves honor, but because doing great things could alone satisfy their natures, and he entered upon the work before him with a single-minded earnestness, and a brave trust in God.

CHAPTER III.

FROM SAN FRANCISCO TO ST. LAWRENCE BAY.

8 July — 27 August, 1879.

The Start. — The Escort. — The Company. — Ounalaska Island. — The Alaska Commercial Company. — Letter to Secretary of the Navy. — Generosity of the Company and its Agent. — St. Michael's. — No Tidings of Nordenskjöld. — The Officers of the *Jeanette*. — Arrival of the Schooner *Fanny A. Hyde*. — The Character of the Crew. — The Arctic Stores of Clothing and Provisions. — The Interpreters. — Off for St. Lawrence Bay. — The Dogs. — St. Lawrence Bay. — The Chief George and his Story about a Ship. — Lutke's Island. — The Last of Civilization.

[THE story of the voyage of the *Jeannette* will be told in the words of the commander. Besides the ship's log he kept a full journal during the voyage, and continued the record after the ship was abandoned. It has been the task of the editor to reproduce the journal with such omissions and corrections only as its form, never intended for publication, seemed to demand. This journal was to be Lieutenant-Commander De Long's record of the expedition, but after leaving San Francisco, and before entering Behring Strait, he had opportunities of sending letters home, and the narrative preserved in this chapter is drawn by turns from his journal and from these letters.]

[FROM THE JOURNAL.]

Upon steaming out of the harbor of San Francisco the *Jeannette* was escorted by some half dozen yachts

belonging to the San Francisco Yacht Club, Commander C. H. Harrison leading them in his yacht Frolic; by the tug Mellen Griffith, hired by J. C. Morison, our shipping agent; by the tug Governor Irwin, carrying his Excellency Governor Irwin, of the State of California, who did us the honor to pay us a visit on board just before sailing, and a party of merchants; the tug Rabboni, with a large number of San Franciscans, and several small steam-launches loaded down with people. The wharves were crowded with enthusiastic friends; Telegraph Hill was black with people who had climbed up there to cheer us and wave adieux; and every ship we passed dipped her colors to us, while shouts, steam-whistles, and yachts' cannon shots kept the air filled with noise. Upon passing Fort Point a salute of twenty-one guns was fired in our honor, while the garrison of the fort cheered us enthusiastically. Astern of us might be seen our consort, the schooner Fanny A. Hyde, laden with one hundred tons coal and such provisions as we could not conveniently carry. The refusal of the Navy Department to send a man-of-war with us as far as Alaska to start us as favorably as was the *Polaris*, Captain Hall, in 1871, when the Congress was sent to Disco, in Greenland, to help her along, made the chartering of this schooner necessary at Mr. Bennett's expense. I may here add that not a sign of a naval officer was seen in the departing ovation. The *Alaska*, *Tuscarora*, and *Alert* lay at the navy yard, only twenty-six miles away; and though the navy yard tug *Monterey* lay at a wharf in San Francisco when we started, having brought the commandant down that morning, she made no move toward participation. On the contrary, when fifteen minutes later she left her wharf, she crossed our wake a mile astern without

even a blast of her steam-whistle as a good-by, and went off in the direction of the navy yard.

Arriving at the Sea Buoy we parted from our accompanying friends, they returning toward San Francisco, cheering us, dipping colors, and blowing steam-whistles until out of sight and hearing. Headed to a course W. N. W. (magnetic), with a light head wind, ship steaming three knots. Arranged the sailor-men in two watches of four hours each; the engineer force in two watches of six hours each; while the duties of watch officers were assigned to Mr. Dunbar (Ice-Pilot), John Cole (Boatswain), and William Nindemann (Ice-Quartermaster).

July 9th, Wednesday. — At 3.30 A. M. lost sight of Point Reyes light, bearing N. E. by E. (magnetic). At nine made fore and aft sail, and at eleven made all squaresail, running her off till canvas drew to strong N. W. wind, which raised choppy sea that broke aboard over either rail. Ship loaded very deep, namely, 11 ft. 9 in. forward, 13 ft. 4 in. aft. Foggy, misty, and at times rainy.

July 13th, Sunday. — At ten A. M. inspected the ship and crew, and found everything neat and tidy. Had the Articles of War read and the ship's company mustered. Then read divine service, and was much pleased at observing that every officer and man, not absolutely on watch, voluntarily attended. Clear and pleasant weather; smooth sea.

[TO MRS. DE LONG.]

AT SEA, lat. $38^{\circ} 13' N.$, long. $132^{\circ} 02' W.$,
450 Miles West of San Francisco,
Sunday, July 13, 1879.

Here we are so far on our way toward the Pole, and it is the most natural thing in the world that I should

sit down to write you. All the first night we had little or no wind, and we poked along slowly, making four knots an hour. The next morning, however, it blew a little from N. W., and freshening rapidly, I put the ship under canvas and steam, and headed her off so that our sail would draw. As the wind freshened the sea got up, and as we were so deeply loaded it broke over us in all directions. For three days we had a very uncomfortable time. Seas were breaking over her rail all the time, and the ship rolled and wallowed like a pig. Mist and rain made it damp inside as well as outside, and she was more uncomfortable than at any time in our bad weather in the Pacific just outside of the Straits of Magellan. Collins and Newcomb promptly went under with sea-sickness, and for three days they were as miserable men as you ever saw. Then the cook got sea-sick, and we had to scratch around for something to eat. The boy seemed to disappear from everybody's gaze for three days, when the doctor found him in the port chart-room, hugging the lockers, and such a specimen. He was just a shadow of his former self, his long pig-tail all in a confused mass of hair flying to the wind, and looking like a corpse resurrected. We gave him some chloroform which straightened him up, and then made him take the lee wheel to keep him in the air, for I really feared he might die. If you could have seen him clutch that wheel frantically whenever she rolled or a sea came on board, with his eyes starting out of his head, and his tongue cleaving to the roof of his mouth, you would understand the amount of anguish he was enduring. Yesterday, however, when the weather moderated and the sea went down everybody brightened up; and as to-day we are having heavenly weather, a bright sky,

light easterly airs, and smooth sea, you would imagine we never had dreamed of such a thing as bad weather.

Now I suppose you will not object to a kind of detailed description of the ship and the people in her. The ship is, I think, all right; she is slow now because she is so deep in the water, running along under steam alone only four and four and a half knots, and burning about five tons of coal a day. But this has been when a heavy swell kept her back. For the last twenty-four hours she has had a light N. E. breeze, and we have made a run of one hundred and thirty miles, or over five knots an hour, and as we are growing lighter every hour we burn coal, I am in hopes in a day or two of getting six knots an hour out of her without trouble. Our cabin is very comfortable and very dry. During the bad weather I had a little fire made in the stove to try it and to dry clothes by, and I assure you it worked admirably, throwing out great quantities of heat and burning but little coal. The fore-castle has been as dry as a bone and very comfortable, and the men seem to appreciate it. The only uncomfortable place has been the deck, and that has been wet all the time. We have not had a chance to settle everything into its place yet, but are getting gradually towards it. My room and the starboard chart-room are all to rights, and look quite cosy and cheerful.

Chipp is, as he always was and always will be, calm and earnest. He has always something to do, and is always doing it in that quiet, steady, and sure manner of his. He smiles rarely and says very little, but I know where he is and how reliable and true he is in every respect. He is putting everything in order quietly and steadily, and he has everything reduced already to a system. To-day, when I inspected the

ship she was as neat as a pin, the men nicely dressed, and everything looking more like a man-of-war than it ever had before.

Danenhower is the same as ever, does his work well, and navigates correctly. Melville is as bright as a dollar and as cheerful as possible all the time. He sits on my left at table, and helps me to carve and serve out. We broke a pump-rod two days ago. Some engineers would have wanted to stop the ship a few days for this, or perhaps turn back. Not he; he says, "All right; we will run without a pump-rod, hey brother, and when we get in I will make you a new pump-rod or fifty of them." I believe he could make an engine out of a few barrel hoops if he tried hard. He is one of the strong points in this expedition. He and Dr. Amler are much alike in some respects. The doctor is all I would have him, bright and cheerful under all circumstances. During our bad weather he was around all the time, cheering up Collins and Newcomb, holding up the Chinese cook, when necessary, and facing the music like a man. He and Melville have christened Newcomb "Ninkum," and occasionally I hear one of them sing out on seeing an albatross, "Here, Ninky, quick, come and catch a goose."

Poor Collins was so sick that he could easily have lost his mother and not have known it. His puns died out for a few days, but he is getting back to them again.

Newcomb in his turn deserves mention. He will, I think, come out all right; he has grit and goes to work like a little man. He was hardly able to stand before he had his lines over the side fishing for albatross, and no sooner had he caught a good one, measuring seven feet across the wings, than he skinned it and got it

ready for mounting. He knows all about his business, every bit, and he takes all about Ninky and the goose in good part, returning to his addressers quite as good as they give. He has his little place in the port chart-room all fixed up with his tools, and is as happy as can be.

Mr. Dunbar is as grave and serious as ever. He frequently speaks about making "pahsages to the South Seas," etc., and has quite a fund of general information which will no doubt be useful to draw from hereafter.

Cole and Sweetman are just the same as they were coming around. Cole, as usual, says nothing, but stands his watch looking all around the horizon as if for a wind. Sweetman looks after the provisions as before, and he and Danenhower have solemn consultations about weights and measures. Our Chinese steward bothers them both dreadfully, for he gets things no matter how carefully they are locked up and put away. He seems to feel that he has but one duty, and that is to get all the food he can and put it on the table. For instance, yesterday he gave us some of that nice cheese which I purchased as a great delicacy during the winter. It was locked up very carefully, but the steward got at it, cut a good large piece out, and placed it on the table, with the pie at dinner. He cannot understand why we should be economical with a ship full of provisions, and, Chinaman-like, will not understand what he does not want to.

The watches are stood by Mr. Dunbar, Cole, and Nindemann. This last is as hard-working as a horse. The second day out a hatchway fell on his little finger and nearly cut it off, but he did not seem to mind it. The doctor sewed it up, and he went ahead as if nothing had happened.

The cook is quite a success since he got over his seasickness, and he cooks everything very well except coffee, and that we shall have to teach him. With coffee his idea is quantity and not quality, and what he lacks in the berry he makes up with water.

The men are first-class, happy and cheerful; they have their musical instruments every night and play and sing. There are so many good voices that I am thinking of getting up a choir with Collins at the organ. To-day at church every officer and man was present, except the men in the engine-room on watch. We made quite a congregation.

Having thus described everybody else, I come to your husband, who hardly needs description. I realize that I am engaged in a great undertaking from which neither of us would have me retreat; that being in it I must make a good showing, and study and plan everything to that end. With God's help we shall certainly do something, however small. I realize how much depends on me, and how much everybody will look up to me for guidance; and I know that instead of repining I must buckle to my work with a will.

[FROM THE JOURNAL.]

July 20th, Sunday. — At 10 A. M. inspected the ship, and held divine service. Informed the crew of Mr. Bennett's intention to follow us with a ship next year, and that he would provide for all widows if anything should happen to any of us. This seemed to have a good effect upon the spirits of all hands.

[TO MRS. DE LONG.]

July 29th. — We are now three hundred miles from Ounalaska. We have had an almost steady head wind

and sea ever since the 13th, and have come along slowly in consequence. What few days we have had a fair wind it has been so light as to be of very little use, hardly strong enough to make a draft for our furnaces. Fog and rain we have had nearly every day.

ARCTIC STEAMER JEANNETTE, OUNALASKA ISLAND,
Sunday, August 3, 1879.

Here we are at last, having reached this place yesterday afternoon, after knocking around for two days in thick fogs among a hundred or more islands, very incorrectly laid down on the charts (some of them not at all), and getting mixed up generally. I have seen some crooked navigation, but our experience in getting through the passes into Behring Sea goes far beyond anything for difficulties. Our great troubles were thick fogs and terrible tides. We were never able to see more than three miles in any one direction, and then only for a few minutes at a time. Getting observations was out of the question, for when we could happily see the sun we could not see the horizon; so we had to grope our way along like blind men. However, we got here all right, and here we are, until Wednesday morning, the 6th instant, when we sail for St. Michael's direct, omitting St. Paul's Island.

We found here the Alaska Company's steamer St. Paul — which sails for San Francisco direct on the 5th instant, and will carry our mail and packages, — the revenue cutter Rush, and the Alaska Company's schooner the St. George. The St. Paul has just come from St. Michael's and St. Paul's, and has one hundred thousand seal skins on board, valued at one million dollars. She has collected all the seal skins from the islands, and is on her way back to San Francisco. It is a splendid chance for us to send our letters, and a

quick one, for she will run down in about eleven days, and you ought to have my letters in five days afterwards.

My only reason for stopping at St. Paul's Island was to get some seal skins and leave a mail for the Alaska Fur Company. But I find I can get all the furs I want here, and the St. Paul has brought down all the agents of the Company, and so I deliver the mail here. I am



UNALASKA.

very glad it is so, because now I can go direct to St. Michael's, which place I hope to reach on the 13th, and leave on the 16th.

Everybody describes the season as an exceptionally open one. The revenue cutter, which has just come south, was as far north as East Cape, and saw no ice anywhere. She did not stop at East Cape or anywhere on the Siberian side, her highest point of call being St. Michael's. At that place everybody was looking anxiously for us, our dogs, sleds, and fur clothing being all ready. The schooner had not yet arrived.

Nothing has been heard of Nordenskjöld. The captain of the revenue steamer supposed he had gone south long ago, or he would have stopped in St. Lawrence Bay to ask. No communication had yet been had with St. Lawrence Bay from St. Michael's, and no tidings had come of course. It is the belief that by the time I get to St. Michael's something will have transpired.

August 4th. — This is a very pretty little place in some respects. It has a beautiful land-locked harbor, surrounded by hills covered with beautiful grass, and looking as green as Brick Church.¹ It is quite warm and pleasant. But the mosquitoes! For the last two nights I have hardly had an hour's rest. Last night I went to bed at ten o'clock, and I assure you I lay awake until half past four this morning killing mosquitoes by the dozen. I am one mass of bites from head to foot. I put up my bed-curtains to keep them out, but they would get in, and seemed to make the curtains an excuse for not getting out. My bulkhead and ceiling is one mass of smashed bodies. I went for them with my slippers right and left, and finally at half past four I dropped off to sleep from sheer fatigue and exhaustion. I was up again at seven, for we breakfast at half after seven.

There is not a white woman here, nothing but men and natives. There is a church here, a Greek church, and yesterday the priest was busy all day marrying couples. The steamer St. Paul brought down a lot of men from St. Paul's Island and St. George's Island who were candidates for matrimony. They reached here Thursday last; made their selections on Friday and Saturday; were married yesterday, and took a stroll to the hill-tops in the afternoon. Some of the men find

¹ A village near New York.

nothing to suit them and are hanging around in a state of indecision.

[TO HON. R. W. THOMPSON, SECRETARY OF THE NAVY.]

ARCTIC STEAMER JEANNETTE, OUNALASKA ISLAND,
August 4, 1879.

The revenue cutter *Rush*, during her visit to St. Michael's and her cruise to the northward, passed through Behring Strait, some twenty miles to the northward and eastward of East Cape in Siberia, without having encountered any ice whatsoever. Supposing that Professor Nordenskjöld had already passed south, no communication was had by the *Rush* with St. Lawrence Bay. No communication from St. Lawrence Bay had been received at St. Michael's at the date of the sailing of the *Rush* on the 23d July, and consequently there was no knowledge of the safety or movements of Professor Nordenskjöld's party. It was my intention originally, as communicated to you in my letter of July 8th, to stop at St. Paul's Island, after leaving this place; but as the fur clothing which I was to have received at that place can be furnished here, I have concluded to proceed directly to St. Michael's in Alaska, leaving here on Wednesday morning, the 5th August. From all the intelligence received from the northward it appears that the last winter has been an exceptionally mild one, and that no obstruction to navigation in the shape of ice has been encountered. I can but deplore that the necessity of loading the ship so deeply at San Francisco has made our progress thus far so slow, owing also to head winds and swell, as to make it doubtful whether we shall be able or not to profit by the open water in the Arctic Sea in our efforts

to gain a high latitude this season. If, upon our arrival at St. Michael's, nothing has been heard of the party under the command of Professor Nordenskjöld, I shall proceed to St. Lawrence Bay in Siberia, to obtain tidings of them.

We have been made the recipients of the most unbounded courtesy and assistance of the Alaska Commercial Company, through its agent at this place. The coal belonging to the Navy Department, and of which there was originally, I believe, some seven or eight hundred tons, has become reduced by the requisitions of the revenue cutter to about eighty tons, which, owing to exposure and spontaneous combustion, has become of indifferent value. The commanding officer of the *Rush*, having expressed to me his desire to have the remaining quantity reserved for his use in proceeding to San Francisco in the coming fall, I have accepted the offer of the Alaska Commercial Company to furnish one hundred and fifty tons bituminous coal for the use of the expedition. This matter will form the subject of a private arrangement between Mr. James Gordon Bennett and the Alaska Commercial Company, and has no relation to our official transactions. We have also been furnished with fur garments, and twelve thousand pounds of dried fish for dog food, both of which have been sent here by the Alaska Commercial Company for our use, from Kodiak. The balance of our clothing, forty dogs, more dog food, sledges, and dog drivers will be furnished at St. Michael's.

I would respectfully call your attention to the fact that the charts of this region are very meagre. The most reliable is one published by the Imperial Russian Hydrographic Office in 1849, which chart was furnished me in San Francisco. The prevalence of fogs, and the

rapidity and uncertainty of prevailing tides, make an approach to any of the passes between the Aleutian Islands hazardous in the extreme.

[FROM THE JOURNAL.]

August 5th, Tuesday. — The St. Paul sailed for San Francisco at 3.30 A. M., carrying our letters and my packages to General Miller. I received from the Alaska Commercial Company a long list of articles for which Mr. Greenbaum declines to receive payment. I desired particularly to pay for the labor of coaling ship, but he replied that his orders from General Miller were to furnish everything we needed without charge, and he cannot take any money even in return for what he expends from the company's funds.

[TO MRS. DE LONG.]

Nothing could exceed the courtesy of the company's agent, Mr. Greenbaum, during the whole of our stay. The entire storehouse was placed at our disposal. A lot of fur clothing had been sent over from Kodiak for our use, — reindeer coats and gloves. We also received eighteen thousand dried fish for dog food, and twenty-five pup seal skins for blankets and floor covers or carpets. The agent gave me for my own use a beautiful coat made of pup seal skins; besides, he gave me a large gown lined with birds' feathers as a morning gown, so you see my luck of having other people give me things has not changed.

When we left on the morning of the 6th everybody was up to see us off; and besides dipping of colors, we had a salute from three small guns in front of the company's office. The priest, no doubt, was among the party, but we cannot say whether the brides and grooms

were there or not. Everybody wished us all sorts of good luck as we steamed out. The first day, of course, we had a head wind, though a fair wind had been blowing for the three days that we were in port. The second day, however, we had a nice little breeze, which freshened so much that — will you believe it? — we made one hundred and seventy-three miles in the first twenty-four hours, and one hundred and thirty-six in the next. Then the wind failed us and came out ahead, and this day we are down to our old speed of four knots.

ST. MICHAEL'S, *August 12, 1879.*

We reached here this morning at ten o'clock. The navigation was not so troublesome as at Ounalaska,



ST. MICHAEL'S

because we had no fog; but the general uncertainty, owing to poor charts and shoal water, made me sufficiently thankful when our anchor was let go off this collection of native huts and one storehouse.

Our schooner [the consort with coal] has not yet arrived, and there is no news of Nordenskjöld. The Alaska Company's agent promptly came on board to welcome us and receive his letters. He had almost given up the idea of seeing us this year. No commu-

nication has been had with St. Lawrence Bay this season, and he knew no more than we could tell him.

I confess I am seriously embarrassed. I fully hoped to find our schooner here, and to learn some tidings of the Swede. I am disappointed in both. I have not coal enough in the ship to warrant me in going away without waiting for the schooner, and it follows that I must await her arrival. Then we must go to St. Lawrence Bay for one more effort to learn something of Nordenskjöld, and, should we learn nothing of him, poke along the northern coast of Siberia until we are frozen in for the winter. Meanwhile our fine season is slipping away, when we might reach Kellett Land and push on to the northward. There are only ten tons of coal here at the station, and that is wanted this winter. I had an idea of pushing over to St. Lawrence Bay to ask about Nordenskjöld, and then coming back to meet the schooner; but this would require us to make double the distance and burn double the coal, and that will not do. Then I thought of going across and leaving orders for the schooner to follow us; but it might take her so long to get across that I gave that up. So I am resigned to wait patiently for the Fanny A. Hyde to arrive.

I have got all the natives at work making our clothing, and it is somewhat of a comfort that in one respect our time is not being wasted. Our dogs and sleds and harness are all ready. These dogs are fine animals, young and active, and they took to me very kindly to-day when I visited them on shore.

This is a miserable place. There are exactly four white men here, and not one white woman. Of the four white men, one is a servant, one Mr. Newman, the agent, one his brother, and the fourth is a private in

the Army Signal Corps, named Nelson, stationed here for the five years of his enlistment to make and record meteorological observations. Desolate and cheerless as the place is, we may yet look back upon it as a kind of earthly paradise.

Our little family of thirty-two having been together now for some time, I can judge of the harmony existing among them. In the cabin everything goes on smoothly and harmoniously. Chipp is as unchangeable and imperturbable as ever; he is occupied now in building a cook-house on deck in the place where the old one stood, but not quite so large. We have considered this wise, because we have already had trouble with the draft to the galley; for it positively refused to burn on the port tack, and besides I want to have the galley where I can look at its cleanliness every hour of the day. Our Chinese servants — but I will tell you about them further on.

Danenhower is the same, and will probably always remain so. He is a hard worker, always writing the log, or figuring over his navigation or provision account.

Melville is more and more a treasure every day. He is not only without a superior as an engineer, but he is bright and cheerful to an extraordinary extent. He sings well, is always contented, and brightens everybody by his presence alone. He is always self-helpful and reliant, never worries about the future, is ready for any emergency, has a cheerful word for everybody night and morning, and is, in fine, a tower of strength in himself.

Dr. Ambler seems a kind of Mark Tapley, jolly when he is probably most uncomfortable (for he is inclined to sea-sickness). He does not take very kindly to canned meats, and utterly denies himself the luxury of our

very superior hash. We have abundance of fresh potatoes and turnips yet remaining; in fact, the deck is full of potato sacks, and he lives mostly upon vegetables. We got a whole sheep in Ounalaska, where, by the way, we also got some fresh beef, and he (Dr. Ambler) is not quite a skeleton yet.

Collins is the same Collins, getting off puns all the time, some of them good and some wretchedly poor. For a while we steadily refused to see his puns, and would all look at him as innocently and inquiringly as babies when he got one off, asking him to explain it two or three times over, until he finally exclaimed that our intellects must be weakening in proportion as we increased our distance from San Francisco. Now, however, we let him pun away, praise the good ones and condemn the bad.

For myself, I am doing all I can to make myself trusted and respected, and I think I succeed. I try to be gentle but firm in correcting anything I see wrong, and always calm and self-possessed. I feel my responsibility and care, and I hope I appreciate the delicate position I am placed in of leading and directing so many people of my own age. I hope God will aid me in what I have undertaken, and bring me through it in safety and with credit.

August 18, Noon. — Our schooner has just arrived, and we have her alongside, and shall soon commence hoisting in her precious cargo. — coal and provisions. During the past six days many longing and anxious looks were directed toward the horizon for a sight of her, and I had already experienced that “hope deferred maketh the heart sick.” Now that she is here we are up to our eyes in work and excitement, for I have appointed Wednesday morning, the 21st inst., as

the date of sailing for St. Lawrence Bay. If God will only give us fair winds and let us save our coal until we are through Behring Strait, we may find Nordenskjöld and reach Kellett Land before the ice freezes us in.

Although the beginning of my letter was dated the 9th, I have been writing a little in it every day. So you must not suppose that nine days went by without my having thought of you and written to you. In fact, I am all ready to go on and tell you about the crew where I left off the day before yesterday.

There is no doubt about it that we have as fine a crew as ever went on board of a ship. They are cheerful, good-humored, ready for anything, and as harmonious as one family. There has not been a sign of a disagreement or a suspicion of a growl. The men seem to realize that every effort is being made to make them comfortable, and they are really very comfortable. Well clad, well fed, and easily worked, they seem to appreciate the easy places in which their lines have been cast. Being in ports where it is illegal to sell liquor there is none to be had, and liberty means simply a chance to go ashore and wander around in the mud and grass. We have set our seine, and have caught enough salmon and flounders to give everybody fresh fish nearly every day. When we could get geese and ducks we have sent a fair portion forward among the men, and have shared alike; and when no geese or ducks were to be had we eat canned meat in common.

The Chinese cook is a good cook, and, as I said in my previous letter, makes good bread; but unless we conclude not to watch things too carefully, and to make no fuss over a stray hair or so, we cannot be happy.

The steward is fair as a steward, and the boy is sim-

ply waste lumber. Under no circumstances shall I keep him beyond this port. He cannot speak English or understand it; he has already, by his stupidity, almost made me grow gray. With it all, he is as childlike and bland as the celebrated "heathen Chinese." He will spill water, break a plate, or stumble over us with a smile that is almost heavenly. All that he is good for is to aggravate the steward, who, though he is his countryman, pitches into him in Chinese without stint.

Our furs are all being made up into clothing on shore, and we have a very fine outfit indeed. With my usual luck, I have met another man who makes me presents. The agent here, Mr. Newman, besides giving me his own outfit of fur clothing, insists on my taking his Winchester repeating rifle with eight hundred rounds of ammunition. In vain do I protest that I do not want it, — the ship owning already four, of which I use one. Mr. Newman seems to think I shall not be properly equipped unless I take his rifle, and so rather than give offense I accept it.

I also organized and sent off a hunting party in the steam-cutter, consisting of Melville, Collins, Dunbar, and the doctor. I gave them a tent and so forth, and they remained away all night, coming back with about a dozen ducks, and stiff and aching from the tramp and sleeping on the ground. The doctor says he is convinced that man must take to hard work gradually to get accustomed to it. I think a tramp like that about once a year would suit him very well.

[FROM THE JOURNAL.]

August 21st, Thursday. — A busy day with us. Commenced to swing ship at nine A. M. for compass deviation. At one P. M. commenced receiving stores from

Mr. Newman, consisting of our fur clothing, forty dogs, five dog sleds, forty sets dog harness, snow-shoes, tanned seal-skins, dressed beaver-skins, twelve sleeping bags, sixty-nine pairs seal-skin boots, seven pairs deer-skin boots, twenty-two pairs water boots, seventy-eight pairs blanket socks, thirteen dressed skins, two dressed wolf-skins, fifty-two double squirrel jumpers, twenty single squirrel jumpers, four light squirrel jumpers, three tame deer-skins, fifty deer-skin pantaloons, twelve hair-seal pantaloons, one undressed deer-skin, four dressed beaver-skins, one baidera, twenty cakes, 2,290 lbs. compressed dog food, etc. The made up garments have been manufactured from the skins, and ten blankets we sent on shore upon our arrival.

Mr. Newman generously presented me with a Winchester sixteen-shooter, eight hundred rounds ammunition, two deer-skin jumpers (parkies), seal-skin boots, water boots, sleeping bag, gloves, and fur cap. To this I must add a beautiful Arctic hare coverlet from Mr. Ketchum, and sixty mink-skins from the same gentleman for ship's use.

In our communications with the natives on the Siberian side we must have an interpreter, and it is advisable also to have some one acquainted with the driving and management of dogs and sleds. For these reasons I have hired two natives, named respectively Alexey and Aneguin, recommended by Messrs. Newman and Nelson, the Signal Corps observer, as well as collector for the Smithsonian Institution. Alexey was a collector of specimens for him, and speaks English and even writes it a little.

The terms of agreement are as follows: Alexey is to receive twenty dollars per month and a proper outfit, which amounts to fifty dollars, and at the comple-

tion of his service a breech-loading (that is, Winchester repeating) rifle and 1,000 cartridges. His wife shall receive provisions (from Alaska Commercial Company at our expense) during his absence amounting to five dollars a month. Aneguin is to receive fifteen dollars per month, a proper outfit amounting to fifty dollars, and his mother shall receive provisions (also at our expense) during his absence amounting to five dollars a month. Both men shall be clothed and found in the necessaries of life until their return to St. Michael's, Alaska Territory.

These two men came on board with me at five P. M. Alexey was accompanied by his wife to say good-by, and also his chief. To the wife we gave a China cup and saucer, with the monogram U. S. N., which pleased her greatly, and for her boy a mouth harmonicum; for the chief, I authorized Mr. Newman to issue a suitable present from the store at our expense. Alexey and Aneguin were nicely dressed up in white men's clothing, and each wore a hat with a red band around it.

The adieux being said at 6.30 P. M. Mr. Newman and Mr. Nelson left us, and at seven P. M. we got under way and steamed out, being saluted with six guns by Mr. Newman and three guns by Mr. Ketchum, and answering with our steam-whistle.

[TO MRS. DE LONG.]

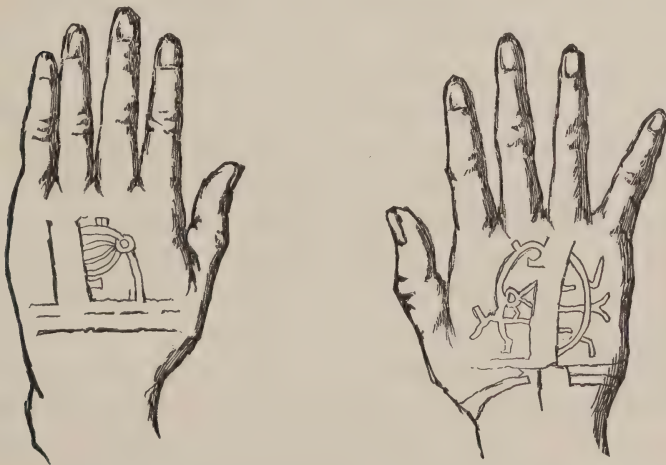
AT SEA, *August 22.*

I have changed all my plans. On the 20th, while we were hoisting in our coal and provisions, I made up my mind that the schooner had about twenty tons more coal than we could carry from here; and as we had to go over to St. Lawrence Bay, I decided that if we had that amount of coal there to replace what we

burned in going over, we should be better off than if we left it behind at St. Michael's. Hence I stopped receiving coal and provisions and got ready for sea, and last evening at seven o'clock we steamed out of St. Michael's, and are now on our way to St. Lawrence Bay. I ordered the schooner to follow us, and she was to leave this morning, and no doubt will arrive quite as soon as ourselves, for she is light and we are very deep. The sea is as smooth as glass, however, and we are going along very nicely. The distance is only three hundred miles, and I expect to make the run in two and a half days.

ST. LAWRENCE BAY, SIBERIA, *August 25, 1879.*

When I had got as far as saying that we expected to make our run in two and a half days I stopped writ-



Native Tattooing. St. Lawrence Bay.

ing for the night, expecting to make a day of it on the 23d for letter-writing. When I got up on the morning of the 23d it was to find an unsettled look in the

weather with quite a swell from the northward. I kept on because we had either to do that or turn back, and I did not like to turn back. As we got out clear of the land into Behring Sea the wind freshened considerably, but we were running along five knots, and every mile made good on our way, and I could not complain. The water is so shallow in Behring Sea that a very ugly sea is raised in a short time, and consequently we had it coming aboard in all directions; we slowed the engines and eased her somewhat, but it freshened to a sharp gale before many hours, and then we had it lively enough — so lively in fact that I had to lay her to and ride it out. This gale lasted about thirty hours, and then moderated enough to let us proceed on our way yesterday afternoon, and enabled us to reach here today at two o'clock P. M. While we were in the gale the day before yesterday one unusually heavy sea broke on board, struck the front of the cabin on my side, stove in my window, and completely flooded my room. I was sitting dozing in my chair, when suddenly I was buried by the sea, covered with broken glass, and everything I had was afloat.

Our forty dogs are a great item. They are all good sized and strong, and thus far roam around the deck in a happy go lucky kind of way, fighting every five minutes, and seemingly well contented. We have five dog sleds from St. Michael's, and the four we brought from England make nine altogether. I got also three skin boats. I hired two natives to go with us as dog drivers, very decent, intelligent men, and, wonderful to relate, very clean. I had them rigged out in white men's costume, and they look very swell indeed. They live with the men of course, and their duty thus far is to feed and water the dogs. The nature of these dogs

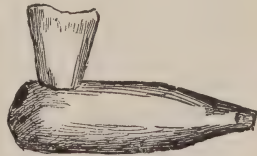
is to fight at all times, and unless they are beaten well they will not keep the peace at all.

Before leaving St. Michael's I discharged the Chinese boy and placed him on board the schooner for passage to San Francisco ; he went on board the schooner with the same childlike and bland smile that has ever characterized him, accepting the inevitable as a philosopher.

St. Lawrence Bay reminds me of the scenery in the Straits of Magellan, with mountains two thousand feet high capped with snow ; the bay is magnificent and solitary. A few dirty natives, clustering alongside the ship for bread, are the only signs of life. The natives have nothing to sell, and appear lazy and worthless to the last degree.

[FROM THE JOURNAL.]

August 25th. — A chief who calls himself "George," and who speaks very often of Captain Cogan in the little English he knows, told me he saw in one of his journeys last winter a ship frozen in in Koliutchin Bay. All my questions as to whether he boarded her then or not could not bring a satisfactory reply, he one time saying "yes," and the next time "no." When I showed him the chart of Admiral Rodgers' survey in the Vincennes, he readily pointed out Koliutchin Bay, East Cape, the Diomed Islands. Continuing his story, the chief said three months ago the same ship which he had seen in Koliutchin Bay came to anchor off his "house," at the northern side of the entrance to St. Lawrence Bay — the bay itself being at that time full of ice. The vessel was a steamer smaller than the *Jeannette*. This time he undoubtedly went on board.



Bone-Pipe.

He says there were twenty-five people on board the ship. The captain was an old man with a white beard, and he did not speak English. There were two officers on board who did speak English, and there was another officer, who was a Russian, and he spoke the Chuckch language like a native. To this last officer the chief spoke. When I asked him if he knew the officer's name, he replied, "Yes, he name Horpish." On looking over the list of the officers who accompanied Nordenskjöld, I find a Lieutenant Nordquist, Russian Navy, and it may have been this officer to whom the chief spoke. He did not know the name of anybody else. This "Horpish" told him the ship was Swiss, (query Swedish?) had wintered in Koliutchin Bay, and was going home. Nobody seemed to have any fur clothing, and everybody that came on deck shivered with the cold. The chief showed me the track of the steamer from Koliutchin Bay to St. Lawrence Bay, and pointed out the course of the



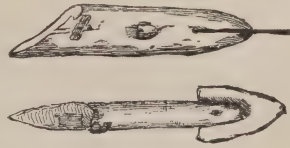
Native's Lamp.

steamer on leaving as towards the Diomed Islands, and thence south along the coast of Kamtchatka. Remaining only until the next day, the vessel steamed out. According to the chief she had "plenty coals." As a way of fixing the date more clearly than the vague statement "three moons ago," this steamer arrived seven days after the departure of Captain Cogan. Nothing else had since called at St. Lawrence Bay until our arrival.¹ This

¹ "None of the natives in the neighborhood of the Vega's winter station professed the Christian religion. None of them spoke any European language, though one or two knew a couple of English words and a Russian word of salutation. This was a very unfortunate circumstance, which caused us much trouble. But it was soon remedied by Lieutenant Nord-

was the sum and substance of the information, and although I questioned the man carefully and repeatedly I could learn nothing further, while the same story was each time repeated in detail. I can account for our not hearing of the arrival of Nordenskjöld, at some place in civilization up to our departure from San Francisco, only on the ground of his being obliged to sail the whole distance to Japan, which is a likely enough supposition.

I landed and strolled over the sand-spit, dignified with the name of Lutke's Island. Here and there were skeletons of whales' heads, bones of walrus, etc.; and I saw what seemed to be a grave, without, however, any mark beyond nine small stones laid in the sand, in this shape : —



Bone Harpoon Heads.



When we anchored, large numbers of ducks seemed to make this sand-spit a resting-place, and several of them with their little families swam around us. But the ship and ourselves seemed to frighten them immediately away, for not one duck was to be found on the island, and the mother ducks and their young paddled away incontinently. A small pond in the centre of the spit was resorted to by small birds like snipe, and Mr. Newcomb shot several to add to his collection. The natives

quilt specially devoting himself to the study of their language, and that with such zeal and success that in a fortnight he could make himself pretty well understood. The natives stated to De Long, in the autumn of 1879, that a person on the 'man-of-war,' which wintered on the North Coast, spoke Chuckch exceedingly well." — A. E. NORDENSKJÖLD'S *The Voyage of the Vega*, p. 369.

here appear to be in a wretched condition. Each family of about a dozen, adults and children, roamed about in its baidera.

[TO MRS. DE LONG.]

August 27th.—The schooner arrived last evening, and we are now hoisting in the last of the coal and pro-



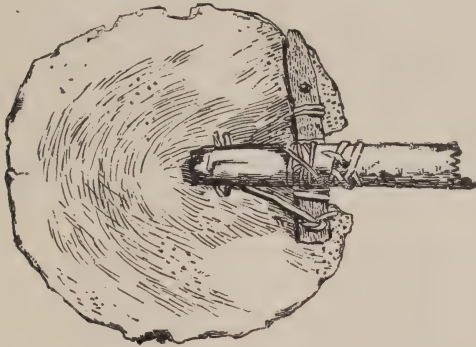
Native's Knife of Bone.

visions, and shall leave at seven o'clock this evening. The weather is beautiful, light southerly breeze, and smooth sea, and I am anxious to be off. And yet it seems like saying good-by once more. However, I am in this thing and I am going to see it through.

I have interviewed the chief who saw the steamer several times since, and I have about come to the conclusion that it was Nordenskjöld's steamer that he saw. When I telegraphed the Secretary asking if the rumors concerning the Swedish Expedition were reliable, he referred to the Secretary of State. This Secretary telegraphed to our Minister at Stockholm, and the Minister telegraphed back that Nordenskjöld, when last heard from, was at Cape Serdze Kamen, and was to leave in May. Now Cape Serdze Kamen is one hundred and thirty miles from here, and there is a settlement on the Cape. I have decided to go there and make an inquiry, and if I find the Swedes were there and have left, I shall push for Wrangel Land at once; if not—and there is the sticker—I suppose I shall have to grope along until I find where they did winter. We have nearly one hundred and sixty tons coal, and all

our provisions in the ship, and we can afford to steam a great deal yet.

We shall tow the schooner outside the harbor as we go. The natives are rather an ugly looking lot, and I do not care to leave the schooner alone with her little crew of six men. I have given the captain fifty dollars for himself; he has waited upon us faithfully, and carries back our mail-bag to General Miller for us, as well as our smiling angel of a Chinaman.



Bone Shovel, Front View.



Bone Shovel, Side View.

CHAPTER IV.

DRIFTING IN ICE OFF HERALD ISLAND.

27 August — 30 September, 1879.

Through Behring Strait. — Cape Serdze Kamen. — A Letter left for Later Vessel. — Chief George. — Koliutchin Bay. — Definite Tidings of the Vega. — Coasting an Ice-Pack. — Herald Island sighted. — Grinding through the Ice. — The Rudder unshipped. — Setting Bear-Traps. — A Sledge-Party toward Herald Island. — Return of the Party. — A Bear-Chase. — Herald Island Disappearing. — Experiments to determine the Air breathed on the Berth Deck. — Consumption of Coal. — The Drift Ice. — An Electric Phenomenon. — Bills of Fare. — Daily Routine.

AUGUST 27th, *Wednesday*. — At 7.35 P. M. we got under way, with schooner in tow, and stood out. Let go of schooner at 9.30, and she stood to the southward and eastward, with northeast wind, while we shaped course N. N. E. and stood toward Behring Strait.

August 28th, *Thursday*. — The day opens with its (to us) usual accompaniment, a head wind. As we approached Behring Strait, the wind freshened considerably, blowing from N. N. W. true, a heavy fog blowing over the bluff highland on the Asiatic side. Just to the southward of East Cape saw a schooner close under the land and standing to the southward. Upon showing our ensign, she hoisted American colors. As she had a crow's-nest at her mast-head, I assumed that she was a whaler. The wind seemed to draw regularly down through the Strait as through a funnel, and as we passed through, the wind hauled to the westward

with us, finally heading us at N. W. true. The surface water ranged from 2° to 4° higher than the air in temperature, but I was unable to detect positively any current, although it would seem natural to suppose that the warmer water set to the northward. The dredge brought up from twenty-eight fathoms a fair collection.

August 29th, Friday. — Before leaving St. Lawrence Bay, I had decided to call at Cape Serdze Kamen to seek tidings of Nordenskjöld. While in San Francisco, I had seen in the newspapers that he had passed through Behring Strait; and I telegraphed to the Navy Department asking if such a report was considered reliable. Before sailing, the Secretary of the Navy sent me a copy of a communication from the Secretary of State, giving the words of a cablegram from Mr. Stevens, our Minister at Stockholm, who had been telegraphed to for information: "Last at Serdze Kamen; was to sail in May." Besides this, I had received a cable from Mr. Sibiriakoff, of St. Petersburg, asking me to leave papers for Captain Sengstaecke, commanding the A. E. Nordenskjöld, a vessel built by Mr. Sibiria-koff, to go in search of the Vega. For these two reasons, therefore, I determined visiting Serdze Kamen, with the hope also of verifying the tidings received at St. Lawrence Bay.

The land to the northward and westward of Behring Strait is so vaguely described in books of sailing directions, and so roughly delineated on the charts, that it was very difficult to determine which cape was Cape Serdze Kamen. We have had no observations for latitude or longitude at noon, and are rather uncertain as to our whereabouts. However, between noon and four P. M. I stood in toward the land for a kind of bay surrounded by high round hills, and at four sighted a col-

lection of native houses on the port hand on a high bluff, and another collection of native houses right ahead on the beach at the foot of the bay. At the same moment the sun appeared, and Mr. Danenhower, by using the given latitude of Cape Serdze Kamen, N. $67^{\circ} 12'$, obtained the longitude as given that place on the chart. This bay appeared to have a general north and south direction, to be about seven miles in width at its entrance, with fine large headlands. All around the edge of the bay was fringed with broken pieces of bay ice in a soft and rotten condition. The bay was in depth about four miles, I should say. Stood in carefully, keeping lead going, and at 5.10 P. M. anchored in 8 1-2 fathoms water, hard bottom, sand, and stones. We kept steam ready for a start at a moment's warning, for a fresh N. W. wind, rough sea, and hard bottom made our anchorage a little precarious.

As soon as the crew had supper, I took whaleboat, and, accompanied by Lieutenant Chipp, Mr. Dunbar, Mr. Collins, and the Alaskan, Alexey, went in towards the settlement at the foot of the bay. I drew up the following paper to be left with the natives, addressed "To the Commanding Officer of any Ship visiting Cape Serdze Kamen:" —

UNITED STATES ARCTIC STEAMER JEANNETTE,
Cape Serdze Kamen, August 29, 1879.

This vessel stopped in here this day at five P. M. to endeavor to learn something about the Swedish Exploring Expedition under the command of Professor Nordenskjöld. We arrived at St. Lawrence Bay on the 25th inst., and learned from the natives there that a steamer which had wintered in Koliutchin Bay had come to St. Lawrence Bay and remained one day, sailing, three months before our arrival, for home by way of the Kamtchatkan coast. Her captain was an old man with a

white beard, and he did not speak English. Two officers on board did speak English, and there was an officer who was Russian who spoke the Chuckch language like a native. With this last officer, who was named Horpish (?), the natives spoke, and were told the ship was a Swiss (?) which was going home, having wintered in Koliutchin Bay. We left St. Lawrence Bay at 7.30 P. M. August 27th. Came here because this is the place at which Nordenskjöld is last reported to be, and because I was requested by Mr. Sibiriakoff, of St. Petersburg, to leave papers here for Captain Sengstaেকে, who commands the steamer Nordenskjöld, now on her way here from Europe. The officers and men under my command are all well, and we expect to sail to-night for Wrangel Land by Koliutchin Bay.

Please communicate this news of us to the Secretary of the Navy, Washington, D. C., United States of America.

GEORGE W. DE LONG,

Lieutenant U. S. Navy,

Commanding American Arctic Expedition.

With this letter and a bundle of newspapers addressed to Captain Sengstaেকে, I attempted to land. Upon getting in toward the beach we found so much ice moving about as to make a landing impossible; but after pulling to and fro for about half an hour, we saw the natives getting ready to come out to us in a skin boat. Presently they succeeded in getting out, but to our disappointment we could not make each other understood. Hoping to learn something by persistence, we led the way back to the ship, the natives following in obedience to our signals. The chief, a stout, not ill-looking man, was seated amidships in his baidera, clad in a bright red tunic and a cloth cap (that evidently came at some time from civilization), with all the dignity of a king.

Upon arriving on board ship nothing could make this

chief or his people understand what we wanted to know, and after an hour's effort, backed by charts and all sorts of pantomime, we had to give it up and let the natives go ashore. I could not leave it like this, so I determined to wait until daylight, send Chipp in again to make a landing if possible, and look for any traces of white men having been there.

August 30th, Saturday. — At three A. M. Lieutenant Chipp went in shore in the whaleboat, accompanied by Mr. Dunbar and Alexey, as also by Mr. Collins. This time a landing was effected, and by great good luck a satisfactory result was obtained. Upon entering the chief's hut another attempt was made to make him understand what we were after, without avail. By a happy inspiration an old squaw was brought forward (who came originally from somewhere in the neighborhood of King's Island), and it was found that Alexey and she could understand each other. From that time forward all was plain sailing. The story heard at St. Lawrence Bay was repeated in detail, — the steamer having stopped here also one day and then gone home. "Horpish" seemed to be equally well known here. Following Chipp's return on board came the chief and his tribe, including the old squaw, and we had the story over again, with the addition that the steamer had wintered on the east side of Koliutchin Bay, had built a house, (an observatory?) which she took down and carried away on leaving. Times and dates we could not get at, nor names, except the never-failing "Horpish."

If Nordenskjöld had left any kind of a written paper at St. Lawrence Bay, or at this place, it would have saved much uncertainty; but as he had no uneasiness about his situation, and of course knew nothing about the excitement in Europe and America, his not leaving

any paper is not to be wondered at. As Koliutchin Bay was somewhat in our track I concluded to look in there in passing.

Lest anybody coming after us should be perplexed for want of proof of our having been at Serdze Kamen, I made sure that the chief knew that he must exhibit the letter which I wrote yesterday to any ship that called in; and, moreover, I gave him a sailor cap with the ship's ribbon bearing the word "Jeannette" in bright gold letters, of which the chief was so proud that I knew he would exhibit it to all foreigners. Collins wrote a notice of our visit on a piece of paper which I signed, and it was pasted in this cap.

All these things being done, and tobacco, tea, and bread being presented (rum was asked for but declined) to the chief and needles to the squaw, and some salmon and deer meat being returned by them, we said good-by, and at six A. M. got under way and steamed out. At ten A. M. saw a baidera under sail standing for us from still another collection of huts near the west cape of this bay. Ran down to them, but as they could not be understood by us, and evidently had not much to say, we left them and proceeded on our way. Foggy and misty from noon to midnight; N. W. and N. winds.

August 31st, Sunday. — During the night let the ship run along west. At five A. M., having run off enough distance to bring us on the meridian of the eastern edge of Koliutchin Bay, sighted a point of land bearing south true, and a low coast line extending east and west. An extensive pack of old ice continuing to about five miles from the land seemed to reach as far as eye could see east and west, with a funnel-shaped opening, the funnel point toward the land. Supposing that such an opening would be caused by a river empty-

ing its waters into a bay, and the chart showing such a river flowing into Koliutchin Bay, I decided to stand into the opening, which we accordingly did at 5.40, the land being hidden at times by passing snow-squalls.

At seven A. M. made out what looked like houses on the ridge of a small hill back from the beach, which I now saw we could not get to on account of the bay ice fringing it for about two miles in extent, — our funnel-shaped opening closing up at that distance from the shore. A little later I could make out several houses quite plainly from my post in the crow's-nest, and at eight o'clock, having reached the edge of the ice, stopped the ship and sent in Lieutenant Chipp, Master Danenhower, Mr. Dunbar, and Alexey in the whaleboat, for one more effort to make sure that Norden-skjöld had passed south in safety. During the absence of the whaleboat kept the engines ready to move the ship, and backed when it was necessary to keep the ship off the ice. At ten, got a sounding in fifteen fathoms, coarse gravel, and lowered the dredge with good results. Mr. Newcomb also shot and added to his collection some large gulls. The whaleboat could be seen from the ship aloft, winding her way in and among narrow lanes of water, and I watched her anxiously while Melville handled the ship, until I saw her land and her people mingle with some natives who had come down to the beach to meet the boat. At one P. M. Lieutenant Chipp and party returned, and brought back information which was reliable beyond question. The Vega wintered here, about two miles more to the southward and westward than this native settlement. Chipp was walked along the beach and the place pointed out to him. As well as could be made out (for no one spoke or understood English on

shore, and Alexey was of no more use in this country than ourselves), the Vega left here for the eastward two or three months ago. Tokens of the Vega were bought by Chipp, he using his vest buttons as ready cash, and brought off to the ship. [Among other things there were three navy buttons, — Swedish, Danish, and Russian.] These navy buttons alone would be proof enough of the Vega having wintered here, because no other ship was in this part of the world with Swedish, Danish, and Russian naval officers on board.

Hoisted the whaleboat and steamed out to the northward at 1.10; at two held divine service, and I believe all our hearts were thankful that at last we knew Nordenskjöld was safe, and we might proceed on our way toward Wrangel Land.¹

The ice on the western side of our funnel-shaped opening made out from the land, so that it was 5.15 P. M. before we were clear enough of the pack to shape our course N. W. by N. At six we sighted a large island, supposed to be Koliutchin Island. During the first watch we were much bothered by loose ice in large lumps, requiring constant conning to avoid trouble. At ten P. M., finding the ice growing heavier, I put her on the other tack to N. E. true, and stood out of it, stopping the engines from 11.40 to twelve, to let the ship drift through some small openings into open water.

September 1st, Monday. — An ordinary day, so far as events go. During the afternoon land was sighted bearing S. W., — probably the land around Cape North

¹ Baron Nordenskjöld, after wintering at this place, was released from the ice July 18, 1879, passed Serdze Kamen on the 19th, anchored off St. Lawrence Island on the 31st, and again off Behring Island August 14th, reaching Yokohama September 2d. When Captain De Long saw Chief George, therefore, the Vega had been gone a month only, and not three, as he gathered from the chief. — ED.

on the Siberian coast. Although this land is sixty miles from our position, I can account for our seeing it only by mirage. It did not really seem over thirty miles. A considerable amount of pack ice was between us and this land. We were favored with a beautiful sunset, and a moonlight and starlight night.

September 2d, Tuesday. — On our course from eight last evening until seven this morning, — N. W. (at which time we were about one hundred miles from the southeast cape of Wrangel Land). But at the last-named hour made the ice-pack ahead, and extending as far to the westward as we could see. During the forenoon watch we ran through a lot of loose ice, making a true north course as well as possible. At 11.30, being through the loose ice, were confronted by the solid pack, which headed us off to the N. E. true during the afternoon watch while we were skirting it.

At noon sounded in twenty-four fathoms, — thick blue mud and shells. A fine S. E. breeze had sprung up by this time, to which we made all sail, and were slipping along six knots while coasting the pack. Being headed off to N. E. true, and increasing our distance from Wrangel Land instead of diminishing it, I decided at nine P. M. to bank fires, save coal, and let her go under sail for the night. Stopped engines therefore at 9.50. To-day, having bright sunlight all day, were able to locate our position by observation. Latitude $69^{\circ} 10' N.$, longitude $176^{\circ} 6' 30'' W.$

September 3d, Wednesday. — A lively day. At one A. M. sighted the ice ahead and on the weather bow. Hauled sharp by the wind, but before we could get steam had closed in on the ice, striking it easily with our port side, and we lay there until we had steam enough to crawl off. No damage done. Found we had

drifted into a bay in the ice. Hauled off to the eastward and southeast.

At daylight the weather became thick and foggy. Sighted a barque to the S. E. under all sail. Had her in sight for three hours, when we lost her in the fog. At her nearest she was four miles distant, and we were too anxious about finding a decent opening in the pack to run down and speak her. At eight A. M., there being nothing but ice in sight, except to the S. E. where we had come from, I concluded to put the ship into a likely looking lead in the pack opening towards the N. W. We accordingly worked along in this lead, keeping a general N. W. direction until 3.10 P. M., when it became so foggy and the ice so closely packed that we stopped and planted an ice-anchor in a convenient floe. Meanwhile, at noon we got soundings in twenty-eight fathoms (blue mud), and towed the dredge, adding some star-fish to our collections. At 4.30 the fog lifted a little and we got under way, working to northward true until 5.30 P. M., when we again anchored to a floe, the fog becoming impenetrable. Calm with thick fog up to midnight. At seven P. M. sounded in thirty-eight fathoms (blue mud). Tired with my day in the crow's-nest.

September 4th, Thursday. — The day opens calm and with a thick fog. Still at anchor to the floe. We observe a gradual closing in of large floes around us, and a seeming drift of small pieces to the southeast through the small water spaces. The rigging is one mass of snow and frost, presenting a beautiful sight; but as we are more interested in progress than in beautiful sights it has but little charm for us. The pack ice surrounding us seems to have a uniform thickness of about seven feet, — two feet being above the water. It is somewhat

hummocky, but I do not observe any hummock greater in height than six or seven feet. New ice has made around the ship during the night, the temperature standing at 29° during the night and up to eight A. M. Sounds as of surf heard to southeast indicating open water in that direction.

At two P. M. the fog cleared away, and we spread fires at once and got under way. The greatest amount of water space seeming to be to the northeast, we made our way in that direction generally, and at 4.30 we succeeded in getting out of the pack into the open sea; that is, comparatively open, because the pack extended from southeast around by west to north, while only to the eastward was there open water. Upon reaching this open water we passed a drifting tree that seemed to have been torn up by the roots, but, more important still, land was sighted at 4.30, bearing W. N. W. true. From the reckoning we have been able to keep of our position, this land is Herald Island, discovered and landed upon by Captain Kellett, of H. M. S. Herald, in 1849. Not caring to put the ship in the close pack which appeared to the northward of us and lose sight of Herald Island without advancing materially, I slowed the engines and kept the ship turning round in circles for the night, just clear of the ice. According to our position we were about forty miles from Herald Island, and as it was very much distorted by mirage we could not make a closer estimate of the distance. Wind dogs around the sun at setting, but a beautiful moonrise gave promise of a fine night.

September 5th, Friday.— A clear and pleasant day throughout, with light northerly breeze. At four A. M. spread all fires and got a full head of steam, and entered the pack through the best looking lead in the general

direction of Herald Island. For the first two hours we had but little trouble in making our way, but at six A. M. we commenced to meet young ice ranging from one to two inches in thickness in the leads, and seemingly growing tougher as we proceeded. We ground along, however, scratching, and in places scoring and cutting our doubling, until 8.40 A. M., when we came to pack ice from ten to fifteen feet in thickness, which of course brought us up. Anchored to the floe to wait for an opening.

During the forenoon there were several occasions when we distinctly saw land beyond and above Herald Island, as well as to the southwest of and beyond it. I should at first have been inclined to think that the land above and beyond Herald Island was a kind of false island made by the mirage; but as the land seen to the southwest of Herald Island was in the shape of high sugar-loaf snow-topped mountains with clearly defined edges, such as could not have been caused by mirage, for there were no hummocks in our floe horizon to be thus distorted, I am strengthened in my belief that we really saw the land. Its distance is impossible even to estimate. Looking across the ice disturbs one's belief in his accuracy in measuring distances by the eye. For instance, on board ship we generally agree as to the distance of an object at sea; but here in the ice no two estimates correspond. We put the distance of this land seen beyond Herald Island at various limits, ranging between forty and one hundred miles; and though since sighting Herald Island last night we have steamed towards it twenty miles, one half the estimated distance, but few of us agree as to its distance now. We range from ten to forty miles. At one P. M., seeing another chance to make a mile or two, we got up steam

and worked ahead through thin, new ice, and between detached pieces of floe. At four we anchored again to a floe, and banked fires. Our sides, on the doubling, are scraped bright, and scratched and cut to some extent, but they are the scars of honorable wounds received in action with the ice.

September 6th, Saturday. — This is a glorious country to learn patience in. I am hoping and praying to be able to get the ship into Herald Island to make winter quarters. As far as the eye can range is ice, and not only does it look as if it had never broken up and become water, but it also looks as if it never would. Yesterday I hoped that to-day would make an opening for us into the land; to-day I hope that to-morrow will do it. I suppose a gale of wind would break the pack up, but then the pack might break us up, and that is not to be desired. This morning shows some pools of thin ice and water, but as they are disconnected, and we cannot jump the ship over obstructions, they are of no use yet to us. A thick fog hangs over everything, even the island. A light northerly wind with a steady barometer, and a temperature ranging between 23° and 32°.

At one P. M. the fog lifted, and we saw a chance of making about a mile toward the island. Spread fires again and commenced forcing our way, ramming wherever we were opposed, and with good effect. Of course, ramming a ship through ice from ten to fifteen feet thick was impossible, but wherever a crack or narrow opening showed between two floes, even of that thickness, we could by judicious ramming, and backing and ramming again, shove them apart enough to squeeze through. Our steam-winch did good service, for we could easily snub the ship's head into a weak place when we did not have room to turn her with the helm. At



ENTERING THE ICE.

4.20, however, we had come to solid floes again, and as the thick fog again shut in we came to with our ice-anchor. Wishing to save even the coal we used with banked fires, until a good chance presented itself for going ahead, I let the fires die out. This evening three bears came down to about a mile from the ship, but fled upon being seen and chased by our hunters. Served out snow-goggles to all hands, with orders to wear them.

September 7th, Sunday. — A day of complete rest in every respect. The day begins with snow, clears, becomes and ends foggy. Ice moving a little, and ship seemingly moving to N. W. At ten A. M. muster the crew, read the Articles of War, and hold divine service. At twelve got soundings in forty fathoms blue mud. In the watch from eight to midnight, experienced a slight pressure on the starboard beam, shoving the ship up on a tongue of ice on the port side and listing her to starboard about five degrees.

September 8th, Monday. — At 1.30 this morning the ship righted again. Thermometer ranging between 22° and 28°. Forenoon foggy; afternoon clear. No sign of a lead in any direction. The northerly winds seem to have cemented the ice into one enormous pack. Soundings at noon in thirty-six fathoms blue mud. The ship has evidently moved since yesterday, when we had forty fathoms. In the first watch the ship heeled again to starboard about 9°, and jammed the rudder hard a-starboard.

Lest at any time the question be asked why I do not unship the rudder and screw at this time, I will record here my reasons. Our rudder is unusually strong and heavy; and though it is a simple matter to unship it, it will be an exceedingly difficult matter to ship it again

unless we have plenty of open water under the stern. If I trice up the screw now, ice will surely form in the clutch and prevent the screw from getting back in place. If I expected the ship to remain in this spot all winter, these reasons would have less weight. But as I consider it an exceptional state of the ice that we are having just now, and count upon the September gales to break up the pack, and perhaps open leads to Herald Island, I want the ship to be in condition to move without delay. Besides, I am told that in the latter part of September and early part of October there is experienced in these latitudes quite an Indian Summer, and I shall not begin to expect wintering in the pack until this Indian Summer is given a chance to liberate us.

September 9th, Tuesday. — A superb day; bright sunlight, thermometer ranging between 21° and 25° . No sign of a lead in any direction. Established our position to be by observation, $71^{\circ} 35' N.$, $175^{\circ} 5' 48'' W.$ At 7.30 P. M., with a sunset entirely free from clouds, made out land distinctly between S. W. and W. and S. S. W. The land furthest to the westward was a kind of table land, with a range of peaks to its southward, terminating in a low, flat strip just behind Herald Island. And this is the land which, two months ago yesterday, we sailed for from San Francisco, hoping to explore this winter. Man proposes but God disposes. Here we are not even able to get to Herald Island. Ship still heeled 9° to starboard, and great pressure on the rudder casing. This must be eased or we may damage the pintles. We have been trying all day to explode torpedoes under the stern, but our slow-match was defective and would not burn, and we could not get an electric current through our non-insulated copper wire. During the last three days have turned the dogs

out on the ice, from daylight to dark, as much to their satisfaction as to ours: to theirs, because they can run around with more freedom; and to ours, because we can keep the ship clean again. As we set bear-traps every night, we call the dogs on board ship to prevent accident. Though each morning we see the undoubted traces of bears, the traps seem to have been avoided.

September 10th, Wednesday. — Calm from midnight to noon, with fog, mist, and snow all day. Lowest temperature 16°, highest 25°. In the hope of helping the ship to right herself, got two tackles up, one at the foremast head, and one at the mainmast head, hooking them to ice-claws and setting them well taut. Broke away the ice around the stern and attempted sawing with ice-saws, but with no other effect than to bend up the saws. The soundings of the past few days have steadily decreased: forty, thirty-six, thirty-five, thirty-two and a half fathoms. The whole pack, with ourselves fast in it, is evidently drifting; but whether the shoaling in soundings indicates an approach to Herald Island or not cannot be proven until we get observations again for position. Not a sign of a lead in any direction.

September 11th, Thursday. — The ship has not righted any during the night. An examination of the ice around the stern this morning shows that we are between two floes about fifteen feet in thickness. The ice on the port side of the ship has been broken on its upper edges and piled up irregularly fore and aft, while on the starboard side (toward which the ship heels) the surface is smooth and unbroken. The strain brought on the rudder by the nip has "broomed" up the port side of the rudder post and rudder casing, and I am reluctantly forced to the conclusion that we must unship it. A more severe nip might break the gudgeons or

bend the pintles, and we might not only lose our rudder, but lose the means of shipping the spare one. Accordingly the rudder is unshipped (with great difficulty, owing to the small water space) and triced up to its davits, across the stern. A thick mist prevented us from seeing the island all day. Soundings at noon in twenty-nine fathoms, light blue mud. Still shoaling. Leaving the lead on the bottom, we were carried away from it toward the northwest.

At last caught something in the bear-trap, but it was unfortunately one of our finest dogs. He was caught by the fore-leg, the tooth of the trap catching between the bones without breaking them, and I hope we shall soon have him all right again. Turned the starboard side of the bridge into a dog hospital, and turned the dog in for repairs.

September 12th, Friday. — The day opened and continued calm and misty with occasional flurries of snow. The only thing to break the monotony was the catching of another dog — our largest, Kasmatka — in a bear-trap. Now that the dogs have learned the way to the traps there is danger of one of them being caught every day; and I consequently ordered the traps to be taken in. Fortunately neither of the dogs caught have had any bones broken or any serious injury inflicted; but we cannot afford to have any of them laid up during the working season.

This inaction is most disagreeable, and it is even more disagreeable to see no chance for a change. The only hope of the pack breaking up is the occurrence of a gale of wind; and as the weather has been so uniformly calm and pleasant since our being beset that the ice has become well connected and solidified, it will require a heavy gale to make a change. Meanwhile, we

are getting no nearer Herald Island, and are making no advance in any direction, unless we are really drifting, ice and all, to the N. W. It is unpleasant to realize that our exploration for a whole year should come to a stop on the 6th September, and that at a point which a sailing ship, the Vincennes, reached in 1855 without any difficulty. And here we are in a steamer, and beset in the pack before we are two months out of San Francisco. My disappointment is great, how great no one else will probably ever know. I had hoped to accomplish something new in the first summer, and we have done nothing. While waiting for next summer we are consuming our provisions and fuel, and running the risk of the enfeeblement of the general health which a winter's confinement may produce.

There is a bare chance of there being drift-wood on Herald Island to help us out in the matter of fuel, and as this is an important matter, I conclude to send a sledge party toward the island to get information. Chipp, therefore, is ordered to prepare for a journey, and accompanied by Melville, Dunbar, and Alexey, to take a sledge and eight dogs to proceed toward Herald Island to-morrow morning at eight o'clock. It is just as well, also, that I should know something about the ice between the ship and Herald Island, and the existence of some harbor into which the ship might be, by some happy circumstance, secured for the winter, if there is to be no further advance for us this season. In making preparations for the sledge journey the day ends.

September 13th, Saturday. — At eight A. M. the sledge party leaves. We are all on deck to see it start, the colors are hoisted, and we cheer the little party as it moves off, the dogs in high glee, dragging the sled

rapidly along after Alexey, who runs and dances before them. We are now brought face to face with another difficulty: where are we to get water to use without expending our fuel in distilling? The ice all around the ship gives water that is unmistakably salt, and our searches thus far cannot succeed in finding ice sufficiently free from salt to be non-injurious to the consumers. Even the snow gives evidence of salt to too great a degree for use; and as we have seen no icebergs at all (in fact no one else has seen them north of Behring Strait), we are without any of the fresh water ice met with in Smith's Sound and Baffin's Bay. Taking Dr. Ambler with me, two sleds, and men with axes, I started off this evening on a search for better ice. About a mile and a half from the ship to the westward we came to a large lump of ice on end on the floe, which, upon being tested by the application of nitrate of silver to a melted portion, shows the presence of from three to five grains of chlorine to a gallon of water. As this is the least objectionable we have found I conclude to use it until we find better, or have rigged some economical apparatus for distilling. Our coal account calls for one hundred and eleven tons, and we must economize so that we shall have enough to work with next season. If our consumption is too great this winter, we must work under canvas and do without steam next summer.

September 14th, Sunday. — At 8.30 we were pleased at sighting the sled party returning, and at nine we welcomed them on board. Chipp reports to me that when about seven miles from the ship he found much lighter ice than the ice-field we are now in, it being composed of floe pieces cemented together by young ice, in many places just strong enough to bear the weight of

the sledge and party. At ten miles from the ship he came to a broad lead, one half mile wide, extending E. and W. as far as eye could reach, with open lanes extending in S. E., S., and S. W. directions. Here the ice was different again, showing evidences of severe pressure. The old floes were closer together, and the young ice was broken and forced up into ridges of eight to twelve feet in height. He followed the edge of this lead to the westward a mile or so, when it turned up to the N. W., with an edge of soft and rotten ice. The ice around Herald Island appeared to be rotten and cut up with leads. The point of view was about fifteen miles from the ship and five miles from the island. The shore was high and rocky, apparently cut in deep ridges, running down the face of nearly perpendicular sides. He saw no place that would offer any protection to a ship. He saw no drift-wood, but sighted many bear-tracks, and one raven, and one young seal which Alexey shot and brought to the ship. There seems to be but one way out of our situation. A heavy gale is wanted to break up this field of ice we are in, and to give us a chance to make our way toward the land which we saw beyond Herald Island. Failing this we must winter in the pack. Herald Island will be of no use to us, even if we could get to it; but we daily seem to be increasing our distance from it by drifting to the N. W. We must hope for observations to give us our position to determine whether we have actually moved or not. At 10.30 A. M. inspected the ship and held divine service.

September 15th, Monday.— Mr. Danenhower succeeded to-day in determining our position by observation. We were at noon in latitude $71^{\circ} 46'$ N., longitude $175^{\circ} 36'$ W., and comparing this position with that of

the 9th inst., we have changed fifteen miles to N. 40° W., or at the rate of two and a half miles a day. Even at this rate, if we continue, we may reach Kellett Land or its continuation before spring. This is of course but a faint consolation, but it seems our only one, for from the mast-head we can see nothing but a field of ice. If there is a continuous current in this part of the world, we shall probably test it by our drift this winter, and perhaps drift toward some new land, as did Weyprecht and Payer, in the *Tegetthof*. As to making any progress with the ship by our own efforts, I see no chance; and it looks as if it would take an earthquake at least to get us out of our besetment. However, "the darkest hour is just before the dawn," and our dawn may be soon coming.

To prevent the water from freezing in the boilers and bursting the tubes and pipes, we to-day emptied them, broke joints, and drained all pipes. If I were certain of staying here all winter, there is much more I should like to do. Our decks are so fearfully lumbered up as to be a sure preventive to our keeping in order. To put up our deck-house, the steam-cutter and spare rudder should be removed. But where shall they be put? If we place them on the ice we may lose them in a break-up, if a break-up comes, and we certainly have no place for them on board ship. I suppose, however, they and many other things must take their chances on the floe this winter.

Both of our wounded dogs are improving, and, having discharged themselves from the bridge hospital, have gone to their brethren on the ice. Our bridge has answered several purposes thus far for which it was not constructed; for Alexey and Aneguin, being overcome by the heat of the berth-deck stove, have rigged

a tent-like covering over the port half of the bridge, and moved in. To-day we feasted in the cabin on the young seal which Alexey shot, and we unanimously pronounced it equal to rabbit. We have again set our bear-trap, baited with seal's entrails, and have placed it so far from the ship that we hope the dogs may not find it.



Seals.

September 16th, Tuesday. — The day opens and continues with a light, southerly breeze; the temperature is from 20° to 30° . During the morning watch land was distinctly seen bearing from W. by S. to S. (both true). However we may be drifting, we are certainly getting more land in our horizon than formerly, and Herald Island is beginning to lose some of that distinctness which made us declare at first that it was only five miles distant. It is only on rare occasions that we see this far off land, and it is impossible to estimate how far off it is. If Herald Island, which we estimated

originally at five miles distance, proved to be between twenty and twenty-five, land which we estimate at sixty miles would prove to be, — I do not care to hazard a guess. At twelve we were able to determine our latitude to be $71^{\circ} 49'$ N. We were unable to get sights for longitude owing to cloudy sky in forenoon and afternoon, so we know only that we have gone to the northward four miles in one day.

In the hope of securing better drinking water for our use Melville has placed in the water kettles on the cabin and fore-castle stoves a ground tier of charcoal. It is an experiment to be sure, for we cannot hope that the charcoal will absorb salt.

September 17th, Wednesday. — A most exciting day. Early in the morning Lieutenant Chipp and Mr. Dunbar went out to have a look at the bear-trap, and they came back at nine to inform me that a bear had evidently been caught in the trap, and had succeeded in breaking it away from the ice and carrying it off with him. Adding Melville to the party we at once set out in pursuit. Reaching the place where the trap had been set, one mile from the ship, we had no difficulty in finding the bear's tracks and following his trail, for the trap made a broad mark, easy enough to trace, even if the drops of blood had not been sufficient. We saw also the tracks of two other bears, one on each side of the entrapped one, as if two friends had remained by him to encourage him in his retreat. We had a long tramp of nearly six miles in the chase. Being somewhat heavily clad and suffering from the heat I had fallen a little behind the others, when I heard a bear howling as if in pain. I ran forward, but the others had already sighted the game and opened fire, and I reached the scene of action in time only to

give the *coup de grace* to the bear entangled with the trap.

Instead of three bears there were but two, a male and a female. The male had only one toe of the left forefoot caught, and yet had managed to break the trap adrift and carry it away without dragging his toe off. He might have left us to make a longer chase had not the chain caught between two small hummocks and anchored him. The female made no attempt to desert him, but ran ahead and back to him as if to coax him on. Upon sighting us both rose on their hind legs and howled dolefully, but the thing was soon over. Chipp and Dunbar with Winchesters, and Melville with his Remington, left me only a finishing shot at one bear.

Hoping that we might get a sight of the third bear whose tracks we had seen, Melville and I remained with the dead, while Chipp and Dunbar returned to the ship to send out men and sleds to carry back the prize. They left us at 11.30 and reached the ship at 12.45. At 2.25 three sleds came out to us, and nearly all hands accompanied them, the afternoon being turned into a holiday for the crew. We quickly rigged up sheers and weighed our bears. The male weighed 580 lbs. and the female 422 lbs. Next we had the two bears photographed by Mr. Collins, and then they were skinned, cut open and dressed, and the meat and skins loaded on two sleds, our beam scale, sheer legs, and photographic gear occupying the third. While on the ground Mr. Newcomb shot several ivory gulls and added them to his collection. We set both of our bear-traps, baiting them with bears' entrails, and after catching a man (Manson) promptly in one of them, without accident fortunately, we set out at 4.10 P. M. on our return journey, reaching the ship at 5.25, after a drag of

three and a half miles, all hands jubilant and happy as after a victory. This is a long article about two small bears, but they were our first, and our enthusiasm is pardonable.

Danenhower had excellent chances to get observations to-day, and he establishes our position to be lat. $71^{\circ} 50' N.$, long. $175^{\circ} 25' W.$, and our drift in the last two days seven miles to N. E. by E. and a quarter E. Soundings at noon in thirty-five and three fourths fathoms blue mud. At sunset the weather had an ugly, threatening look.

September 18th, Thursday. — The day opens with a fresh breeze from S. E. which gathers strength, and the temperature rises from 30° to 35° . The effect upon the surface of the ice is to make a great deal of sludge and several small pools and ponds. No perceptible change in our position, but I have no doubt the ice is moving to the N. W., and carrying us with it. If this weather continues there may come a liberation for us, "a consummation devoutly to be wished."

The ice is proving too salty for cooking and drinking purposes, and we have fallen back upon melted snow. Occupied the men to-day in altering and lengthening our sleeping bags, which are too short and too cramped at the feet. Soundings at noon in thirty-six fathoms blue mud. Bring in our bear-traps lest we should lose them by the ice breaking up.

September 19th, Friday. — The S. E. blow of yesterday continues throughout the night until noon, when the wind backs to E. S. E. and moderates. The barometer slowly falls to 29.55 and there stops. The weather all day is overcast and misty, with passing showers of rain. The temperature remains uniformly at 33° and 34° . At 8.30 A. M. Herald Island bears south

(true), and is very distant. The changes in appearance of this island have been slowly panoramic. We have crossed its face from east to west until its western end bore south, and have then steadily drifted away from it to the northward, so that from a panoramic view we have come to a dissolving view.

September 20th, Saturday. — The doctor informs me this morning that he has made during the night experiments on the berth deck, to determine the amount of carbonic acid while the men were asleep and breathing the atmosphere of the deck. The experiments were made with what is known as the "wet jar," and the result was as follows: In every thousand volumes of air there were two and thirty-two hundredths (2.3246) volumes of carbonic acid, which, reduced to a percentage, shows .23246 per cent. The records of the expedition of the *Alert* and *Discovery* show .436 per cent. on the berth deck of the *Alert* on February 29, 1876, and .482 per cent. in the ward-room on January 18, 1879, both observations being made under the very worst circumstances of housing and confinement. While, therefore, our showing is a very favorable one in comparison, still it is a bad one, for we are only in September, with a temperature mild enough to leave open every access to the fresh air.

To experiment still further in this matter, and to prevent the willful or accidental closing of any doors or the sky-light of the berth deck, and to endeavor to prevent any serious amount of carbonic acid in the ward-room and cabin, I issued to-day orders in regard to the ventilation of these apartments. While these orders are being carried into effect, experiments will determine their efficiency in accomplishing the desired result.

The measurements taken by the doctor to determine the cubic air space per capita show that we are deficient in that respect also. The berth deck is only 78 cubic feet, the ward-room 180, the cabin rooms 333, and the entire cubic air space of the cabin amounts to 1,500 feet. In the *Alert* the cubic air space per man was 107, and in the *Discovery* 140. The comparison is again unfavorable. The cubic air space will be increased for the men when we come to build our deck-house, and I hope the carbonic acid gas will largely disappear in that edifice.

All these things, and the disappointment at having accomplished so little the first season, give me enough to think about. There is nothing, however, but patience and earnest effort to improve matters that will avail me anything, and to these two things I must devote myself.

The result of the S. E. blow and the mild temperature has been to open lanes in our immediate neighborhood, but none of them are of any great extent, and the heavy pack shows across the openings which are not more than fifty feet wide. If we were not securely held between two floes, I would move into one of these leads, even if we advanced only half a mile. (We would have moved at all events and have broken the monotony.) But we are securely held as in a vice, and heeling 5° to starboard. Soundings at noon in forty fathoms blue mud. We are now increasing our depth as we increase our distance from Herald Island. Brought up some new specimens with the dredge.

September 21st, Sunday. — At the usual Sunday inspection held by me to-day, I concluded to make some changes in the internal arrangements of the berth deck. The order of yesterday about keeping the doors open

leading from the old galley-room to the berth deck must be modified, as the cold is too great at night and causes the men to complain sadly. We therefore bored sixteen $1\frac{1}{8}$ inch holes in the lower panel of each door, which I hope will insure a proper supply of fresh air.

Nindemann has up to this time occupied a cot hung in the old galley-room. In order to move him into the fore-castle, I order a man transferred from one of the after berths to one of the vacant forward ones. This brings the transferred man too near the stove, which is in the eyes of the ship, and we must move the stove to the middle of the berth deck and carry the mess table forward. These additions to the carpenter work of the ship necessitate taking Nindemann off watch and adding him to the carpenter gang. During past week the engineer's force has been employed in scaling and cleaning the port boiler, and overhauling and laying up the engines. The coal return for the past week is as follows:—

Galley . . .	1,000 lbs. = daily average,	142 $\frac{1}{2}$ lbs.
Cabin . . .	360 lbs. = daily average,	51 $\frac{3}{4}$ lbs.
Berth Deck .	440 lbs. = daily average,	62 $\frac{1}{2}$ lbs.
	<hr/>	<hr/>
Total, . . .	1,800 lbs. = daily average,	257 $\frac{1}{2}$ lbs.
Amount of coal remaining on hand, .	110 $\frac{1}{2}$ $\frac{3}{4}$ $\frac{3}{8}$ tons.	

As coal is the most precious article which we have on board ship, its economical use is a matter of paramount importance. To bring about the utmost economy, I have concluded to put the whole affair in the charge of Chief Engineer Melville, and to give him entire cognizance of all stoves, the galley, and the issue and expenditure of fuel. I have therefore given him a written order to that effect.

At 10.30 A. M. perform divine service. At noon we

obtain our position by observation, — latitude $72^{\circ} 10' 23''$ N., longitude $175^{\circ} 26' 22''$ W., — and from this position we establish the fact that in four days we have drifted twenty miles to the north, one degree west, or at the rate of five miles a day. Herald Island is almost a thing of the past. It is now but a small patch in the horizon, difficult to separate from the intervening hummocks. From ten to eleven P. M. have a fine aurora. The ship still altering her heading in the last twenty-four hours from S. W. and $\frac{1}{2}$ S. to W. by N., both magnetic.

September 24th, Wednesday. — At two A. M. the thermometer registered 7° , our lowest thus far, and the temperature gradually rose until at noon it reached 24° , and remained nearly the same to close of day. Obtained to-day longitude only, — $175^{\circ} 21' W.$, — showing a drift of seven miles to the east in two days.

This drift of ours is in no sense uniform or capable of being foreseen. It does not depend seemingly upon the wind, for it is different with the same winds at different times. That even light winds occasion drift and pressure is evident from the fact that the ice about a mile from the ship in all directions is constantly assuming new shapes. We seem to be held in the centre of a large floe, sufficiently strong to save a severe nip to the ship and to resist pressure on its edges. A mile from the ship in any direction new ice six inches thick is piled up in tables from six to twenty feet in height by the coming together of floes. One day we find large spaces of water, the next day we find the spaces narrowing, and the third day the spaces are closed and slabs of new ice six inches thick are piled up on end like a confused fence six, twelve, and eighteen feet high. We seem to move only in azimuth, remaining

heeled over to starboard 5°. Our floe suffers no jar even, and immediately around the ship the conditions of ice do not change, except as snow-falls level all the projecting surfaces.

An occasional gull is all that we see, and each day the number seen diminishes. Occasionally a seal appears in an open pool, and is fired at without success. According to Alexey, a seal hit in a bone will sink or die under the ice, — an explanation for several hits failing to secure the seals struck. The experiment for carbonic acid on the berth deck since the boring of the auger holes in the door and the moving of the berth deck stove show an improvement. Last night's figures give 1.8012 volumes of carbonic acid per one thousand volumes of air, or .18012 per cent.

September 25th, Thursday. — At 1.50 A. M. a very curious electric phenomenon was observed. A ball of electric light formed about one quarter mile from the ship on the surface of the floe (in size about that of "a barrel," according to Mr. Dunbar), throwing out rays in all directions, and slowly rose and worked away from the ship, decreasing in size and brilliancy. When almost extinct it advanced again, increasing in brilliancy, and, descending to the floe, disappeared. This occurred twice in seven minutes. The appearance of the electric ball was preceded by a fine aurora. Unfortunately Mr. Dunbar, who had the watch, did not call me to see this extraordinary occurrence. Mr. Collins was called, but before he came on deck the display was over. The foregoing is made from Mr. Dunbar's description.

At 5.40 P. M. land is sighted bearing S. by W. and $\frac{1}{2}$ W. true; and although mirage has distorted its outline into an unknown and unrecognized shape, I am quite

sure it must be Herald Island. All sign of bird life seems to be gone. On rare occasions a gull is seen, but only in the neighborhood of a water-hole, and these water-holes are growing extremely rare. One bear-track was sighted this afternoon to our satisfaction, for we had begun to fear that bears too had disappeared with the birds. Not a bear-track has been seen save this one since our capture of the 17th inst.

September 28th, Sunday. — Snowing pretty much all day. At ten A. M. inspected ship and had divine service. In the afternoon Mr. Newcomb and Alexey shot two female walruses about two and one half miles from the ship, weighing about one thousand pounds each. Sent out the dogs and dragged them in, one after the other, gaining a valuable addition to our dog food. One of the females was with young, and I have directed Mr. Newcomb to save the fœtus. He will also save the skin of one in order to mount it on our return, and the head of the other for mounting on board ship. The wisdom of having one officer look out for our fuel is evident. The coal report shows a saving of three hundred and seventy-five pounds in the past week.

September 30th, Tuesday. — The month ends with a full moon, but beyond an occasional view of it through drifting snow it has not been of much comfort. It makes but little difference, however, because we have so much sunlight that we can be very independent; but I suppose the time will soon come when we shall consider the moon our best friend, and watch anxiously for her advent.

Our drift since last observation (26th inst.) has been five miles S. W. by W. We seem to swing around a kind of an irregular triangle, independent somewhat of local circumstances of wind or current. After our first

besetment we had a positive drift to the northward, and then an equally positive drift to the eastward (making two sides of the triangle), and now we seem to begin the third side leading back to the beginning. Either we are in a kind of dead-water back of a current, or the floe in which we are caught is loose among a lot of surrounding fields of ice, and we carom from one to the other. On our clearest days we can see no land, else I might hope that we had drifted into a pocket between two islands or two continents, and might probably remain thereabouts until spring.

The meteorological observations have shown several times of late that the water at the bottom has been from one and one half to two degrees colder than at fifteen fathoms, and the water less dense. Mr. Collins argues from this the existence of a warm current at fifteen fathoms, but until the change in temperatures is more decided I shall withhold my acquiescence in that opinion.

In order to have an exact estimate of the amount of food consumed by the crew and officers, and to place it upon record in case of any inquiry hereafter, I have caused an exact account to be kept of the meals for the past week, and will enter it here. The food here mentioned has been served out regularly since leaving San Francisco (with the exception, of course, of bear meat, and in its absence some preserved meat has been supplied), and the bill of fare for one week will serve as an index to the whole. We have still a large quantity of fresh potatoes, and a small quantity of fresh carrots and onions, so that for some time we shall not be down to our strict ration table. When all our fresh vegetables are gone, another week's meals will be entered as a sample. We keep our vegetables from freezing by stowing them in a coal bunker.

BILLS OF FARE FOR PRECEDING WEEK.

Articles marked with an X were given to officers' mess only. Pepper, salt, molasses, vinegar, mustard, and sauces not mentioned.

Wednesday, September 24, 1879.

BREAKFAST.

Beef	8 lbs.
Potatoes	20
Fresh Bread	11
Butter	$2\frac{1}{8}$
Coffee	$2\frac{1}{8}$
Sugar	$2\frac{1}{8}$
	<hr/>
	$45\frac{3}{8}$

DINNER.

Pork	33 lbs.
Beans	16
Tomatoes	10
Potatoes	5
Pickles	$2\frac{6}{8}$
Flour for Duff	16
Raisins	4
Hard Bread	13
	<hr/>
	$99\frac{6}{8}$

SUPPER.

Bear Meat	18 lbs.
Peach Butter	$3\frac{1}{2}$
Green Gages X	3
Potatoes	15
Tea	1
Sugar	$2\frac{1}{8}$
Butter	$2\frac{1}{8}$
Fresh Bread	11
	<hr/>
	$55\frac{9}{8}$

Total number, 33; total weight, $200\frac{3}{8}$; average per man, 6 lbs. 1 oz.

Thursday, September 25th.

BREAKFAST.

Haddock X	4 lbs.
Corn Bread X	12
Pork	7
Potatoes	15
Coffee	4 $\frac{1}{8}$
Sugar	4 $\frac{1}{8}$
Milk	$\frac{1}{2}$
Bread	15
Butter	2 $\frac{1}{8}$
	<hr/>
	63 $\frac{3}{8}$

DINNER.

Bear Meat	24 lbs.
Soup	7
Pork	4
Corn	12
Potatoes	12
Hard Bread	5
	<hr/>
	64

SUPPER.

Mutton	7 $\frac{1}{2}$ lbs.
Ham X	3
Potatoes	12
Peach Butter X	1 $\frac{1}{2}$
Dried Apples	3 $\frac{1}{2}$
Butter	2 $\frac{1}{8}$
Sugar	4 $\frac{1}{8}$
Tea	2 $\frac{1}{8}$
Milk	$\frac{1}{2}$
Bread	15
	<hr/>
	51 $\frac{1}{4}$

Total number, 33; total weight, 178 $\frac{1}{8}$; average per man, 5 $\frac{1}{2}$ lbs.

Friday, September 26th.

BREAKFAST.	
Codfish	12 lbs.
Mackerel X	4
Hominy	7
Potatoes	15
Bread	10
Sugar	$3\frac{2}{8}$
Coffee	$4\frac{2}{8}$
Butter	1
Milk	$\frac{1}{2}$

 56 $\frac{3}{4}$

DINNER.	
Salt Beef	32 lbs.
Tomatoes	10
Potatoes	15
Hard Bread	8
Flour	3
Pumpkin X	1
Lard	1
Sugar	2
Milk	1
Split Peas	8
Bacon	2

 83

SUPPER.	
Bear Meat	18 lbs.
Potatoes	15
Prunes	5
Bread	10
Tea	1
Sugar	$3\frac{2}{8}$
Milk	$\frac{1}{2}$
Butter	1

 53 $\frac{1}{8}$

Total number, 33; total weight, 193 $\frac{4}{8}$; average per man, 5 lbs. 13 oz.

Saturday, September 27th.

BREAKFAST.

Beef	8 lbs.
Potatoes	20
Sugar	$4\frac{1}{8}$
Milk	$\frac{1}{2}$
Coffee	$4\frac{3}{8}$
Butter	1
Bread	10
	<hr/>
	$48\frac{5}{8}$

DINNER.

Beef Soup	12 lbs.
Mutton	15
Macaroni	4
Tomatoes	6
Cheese	2
Potatoes	10
Hard Bread	10
	<hr/>
	59

SUPPER.

Beef	8 lbs.
Kidneys X	2
Potatoes	15
Quince Butter	5
Bread	15
Tea	1
Sugar	$4\frac{1}{8}$
Milk	$\frac{1}{2}$
Butter	1
	<hr/>
	$51\frac{3}{8}$

Total number, 33 ; total weight, $158\frac{1}{8}$; average per man, 4 lbs. $12\frac{3}{8}$ oz.

Sunday, September 28th.

BREAKFAST.

Beef	8 lbs.
Oat Meal	7
Potatoes	15
Bread	10
Sugar	$4\frac{1}{16}$
Coffee	$4\frac{2}{16}$
Butter	1
Milk	$\frac{1}{2}$
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	49 $\frac{11}{16}$

DINNER.

Ox-Tail Soup	12 lbs.
Roast Bear	26
Pork	4
String Beans	12
Potatoes	10
Beets	$4\frac{1}{2}$
Jelly	$\frac{1}{2}$
Hard Bread	1
Raisins	3
Flour (Duff)	16
	<hr/>
	89

SUPPER.

Mutton	8 lbs.
Potatoes	15
Damsons	6
Pears X	2
Flour	6
Yeast Powder	$\frac{1}{4}$
Ginger	$\frac{1}{4}$
Bread	15
Sugar	$4\frac{1}{16}$
Tea	1
Milk	$\frac{1}{2}$
Butter	1
	<hr/>
	59 $\frac{1}{16}$

Total number, 33; total weight, $197\frac{1}{2}$; average per man, 6 lbs.

Monday, September 29th.

BREAKFAST.

Beef	6 lbs.
Mutton	3
Bread	20
Sugar	$4\frac{1}{16}$
Butter	1
Coffee	$4\frac{2}{16}$
Milk	$\frac{1}{2}$
Potatoes	5
	<hr/>
	$43\frac{2}{16}$

DINNER.

Mutton Broth	12 lbs.
Roast Beef	14
Tomatoes	6
Okra	4
Potatoes	15
Hard Bread	5
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	56

SUPPER.

Bear Steak	20 lbs.
Potatoes	15
Bread	15
Sugar	$4\frac{1}{16}$
Butter	1
Milk	$\frac{1}{2}$
Tea	1
Dried Apple	5
	<hr/>
	$61\frac{3}{16}$

Total number, 33; total weight, $161\frac{1}{2}$; average per man, 4 lbs. 14 oz.

Tuesday, September 30th.

BREAKFAST.

Bacon	13 lbs.
Hominy	7
Potatoes	15
Bread	10
Coffee	4 $\frac{1}{8}$
Butter	1
Sugar	4 $\frac{1}{8}$
Milk	$\frac{1}{2}$
	<hr/>
	55 $\frac{5}{8}$

DINNER.

Beef Soup	12 lbs.
Roast Bear	26
Pork	4
Potatoes	15
Hard Bread	5
Onions	3
Gooseberries X	1 $\frac{1}{2}$
Lard	$\frac{1}{2}$
Flour	1
	<hr/>
	68

SUPPER.

Beef	8 lbs.
Potatoes	15
Bread	15
Tongue X	3
Tea	1
Sugar	4 $\frac{1}{8}$
Milk	$\frac{1}{2}$
Duck X	1 $\frac{1}{2}$
	<hr/>
	48 $\frac{1}{8}$

Total number, 33; total weight, 171 $\frac{6}{8}$; average per man, 5 lbs. 3 oz.

DAILY ROUTINE.

September 6th to September 21st.

- 4 A. M. Call ship's cook.
- 6 Call all hands. Coffee.
- 6.30 Turn to. Clean decks. Wash clothes.
Break ice in fire-hole. Execute morn-
ing orders.
- 7.30 One watch to breakfast.
- 8 Other watch to breakfast.
- 8.30 Turn to. All hands on deck when any
particular work to be done, otherwise
one watch only.
- 10 Report berth deck ready for inspection.
During forenoon the watch to provide ice
or snow for making water, and attend to
general work.
- 11.30 Soundings. Water temperatures at bottom
and every fifteen fathoms, etc. Calcula-
tion of sea densities at same depths.
- 11.45 Lower dredge through fire-hole.
- 12 M. Watch below to dinner.
- 12.30 P. M. Relieve watches and other watch to dinner.
- 1 Turn to all hands, or one watch at work if
necessary.
Haul up dredge; examine and bottle con-
tents.
- 4 Relieve watch.
- 5.30 Watch below to supper.
- 6 Relieve watch; other watch to supper.
Watch peel vegetables. Collect all buck-
ets and put them on quarter-deck near
fire-hole.

8 P. M. Out galley fire; boatswain and carpenter report. Set anchor (?) watch of one man: watch lasting two hours.

9 Put out berth-deck lamp.

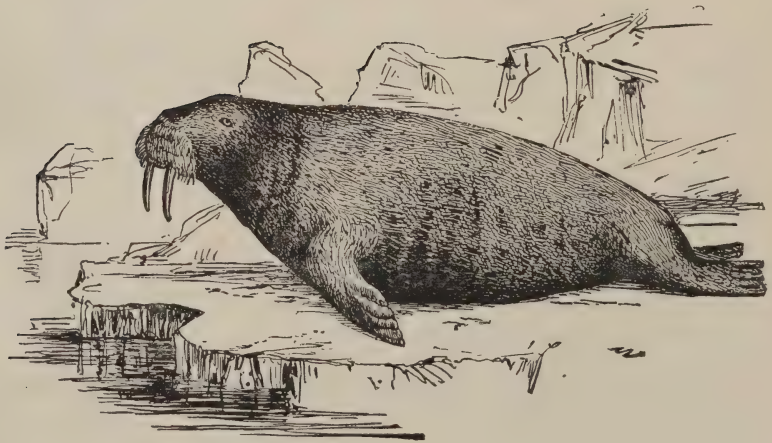
From September 22d to 30th the routine was changed to the following extent:—

7 A. M. Call all hands, ship's cook being called at 5 A. M.

One watch do the work before breakfast.

6.30 P. M. Out galley fire.

7 Boatswain and carpenter report.



CHAPTER V.

FAST IN THE ICE.

October — November, 1879.

Reappearance of Herald Island. — Condition of the Quarters. — Ross's Gull. — Moisture between Decks. — New Land in Sight. — Winter Routine. — A Beautiful Night. — Doctor Ambler's Dream. — Cracks in the Ice. — The Noises of Ice Cracking. — The Grinding. — Clear Water on the Port Side. — Necessity and Anxiety. — The Dogs. — Disappearance of the Sun. — Adrift from the Floe. — Distilled Water. — Arctic Beauty.

OCTOBER 1st, *Wednesday*. — The day opened cloudy and snowing, with a stiff east northeast breeze, and a generally unsettled look about the weather, which promised a blow. For the first three hours the anemometer indicated a velocity of fourteen miles an hour, and the fourth hour it had increased to twenty-one miles an hour. It remained near this velocity until six P. M., when it increased to twenty-seven miles, and reached its maximum at eight P. M., of twenty-eight miles. From that time until the day ended it averaged twenty-four miles an hour, the wind since noon having backed to N. E. and N. true. Though the gale was from the northward and eastward, it was not accompanied by any low temperature particularly, the highest being 20° and the lowest 11°. It may be that there is open water to the northward of us of a warm temperature, and the wind blowing over it has had the chill taken off it before reaching us. The gale was accom-

panied with considerable snow, in perfect squalls, blowing like dust into every crevice and choking it up. While out for exercise it was next to impossible to see through the snow, and our tracks were filled as soon as made. Everything was one blinding mass of snow-dust.

October 2d, Thursday. — Went out in the afternoon to see the result of the gale. To the northward of us there was quite a space of open water, extending about three miles east and west and one half mile in width. Across the opening, ice could be seen in pack, and the floe, in which the ship was fast, seemed to be moving past it to the S. E. To the southward and eastward of us the same extent of open water was visible, and the surface of our floe was soft and mushy, making us sink frequently to the ankles.

October 3d, Friday. — Soundings at noon in $24\frac{1}{2}$ fathoms blue mud and dark gravel. The dredge brought up some delicate white coral. This is a very interesting circumstance, for, unless this has been carried here by the warm waters of the Kurosiwo current, its presence can be accounted for only by natural growth, and I have never heard of coral forming in such cold waters as those we are now in.

To our great surprise, Herald Island was in plain sight this morning, bearing S. S. E. (true), and distant probably thirty miles. We have drifted to the S. W. of our last position, therefore, about thirty miles, or at the rate of ten miles a day. My remark about our drifting on the third side of the triangle is verified fully. Whether there is heavy ice impinging on land to the northward of us, which keeps our ice-field from advancing (in fact, caroms it back), or whether there is a regular S. W. current, I cannot yet say; but it looks

now as if we were in a fair way to drift down between Herald Island and Kellett Land. In this case we may have some land near to us when the ice closes together and becomes immovable to a certain extent, and we may yet have the honor of being the first to land on this already discovered but yet unexplored shore.

At three P. M. we were startled into activity by the report of "A bear on the ice close to the ship!" Five or six of us immediately went in pursuit, spreading out to inclose the bear should he allow it. He had a long start, however, and most of us gave up the chase after a mile or two. Mr. Newcomb, Aneguin, and Alexey kept on, and at 5.20 Aneguin came back with the pleasant news that the bear had been overtaken and killed. Melville and I took a couple of sleds and teams and some men, and brought back the prize — a female bear, weighing, I should judge, about 500 pounds. The captors had already skinned and cut up the carcass, so we could not weigh it. This makes a valuable addition to our larder. The skin was nicely taken off with the head attached, and will no doubt be in good condition to be mounted hereafter.

October 5th, Sunday. — At ten A. M. read the Articles for the Government of the Navy, and mustered the crew. Everybody seemed in excellent health and spirits, and nothing disheartened by our being thus early beset and the almost absolute certainty of our wintering in the pack. The fore-castle was dry, warm, and comfortable. Not a sign of moisture was to be found, except a trifle coming from the rods of the deadlights, and this was received and retained in the drip pans placed under them. The cook-house on deck was neat and clean. All the internal arrangements of lockers, water cans, and boxes being complete, the galley was as orderly as

a private kitchen. The two berths for steward and cook were neatly curtained off, and it would require a critical examination to reveal the fact that these two men slept there. The engine-room and shaft alley were clean and dry. The starboard boiler has been finished with its overhauling, and both boilers are now thoroughly scaled and ready for use. Instead of taking the engine apart for laying up, it has been kept intact; and as the engine-shaft can be disconnected from the screw-shaft, the engines can be turned over every day, moving all parts. The two shafts are connected by shoulders and four bolts, two of which are replaced as soon as the engine is turned over, and the other two are kept ready for immediately putting back. During the coming week the engines will be painted. The ventilation of the ward-room seems improved since the boring of the holes through into the cabin, and the keeping of a lighted lamp in the ward-room stove. In the cabin the air is good enough, except at night, when the wretched Walton lamp smokes so as to fill it. Melville has made a tin pipe four inches in diameter, perforated with half-inch holes, and fitted it into the skylight cover, and this works well without depriving us of the light. The frame of the deck-house is all up and the roof on. Nearly all the siding is in place, and during the coming week the ends will be closed in, the inside felted, and the electric engine and generator put together and tried with walrus blubber.

After inspection held divine service.

The coal account is satisfactory, showing even greater economy than last week, the fuel burned for heating and cooking being 1,280 pounds against 1,425 pounds consumed last week. Aneguin to-day added a seal to our provisions.

October 6th, Monday. — The events of the day can be summed up in a few words. Mr. Newcomb shot 28 ducks, and the observatory was erected on the floe about 100 yards from the ship, and lashed down to ice anchors. The work of the deck-house is progressing.

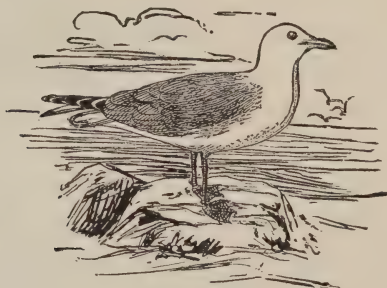
October 7th, Tuesday. — At times during the day a great deal of land was in plain sight, the most prominent bearing S. 54° W. (true). It appeared like a series of high lands sloping to low points, or a chain of islands. At intervals it would be greatly distorted by mirage, and again it would stand out hard and plain. Clouds could be seen above it and separated clearly from it. Towards sunset, when we had a perfectly clear background, these lumps of land stood out sharply defined against the sky, and were pronounced land unmistakably by those on board as well as by Melville and myself, who were three miles from the ship, on our daily run with a sledge and dog team. We may have something ahead of us in the way of exploration, this winter, after all.

Mr. Newcomb (who is indefatigable in his efforts to make a good collection of objects of natural history) added to his collection a "Ross's Gull," a most valuable prize and rare beyond calculation. In all Europe there is but one (at the Museum in Mainz), and there is no record of one in the United States.

October 8th, Wednesday. — In order to give the doctor more time to devote to preparing medicines for sledge journeys, and upon his representing that he thought he had more than his share of the meteorological work, and that he did not get sufficient sleep, I modified my meteorological order of August 7th so as to relieve the doctor of observing from eight P. M. to midnight, and assigned the first half of that watch

to Chief Engineer Melville, keeping the last half myself.

October 9th, Thursday. — The day opened with the continuation of the easterly blow of yesterday, and



Ross's Gull.

gradually tapered off to a light air, when at noon a shift to W. by S. (true) occurred, and a piping up of another gale, which settled finally in W. S. W. Highest temperature (with easterly wind) 31° , lowest temperature (falling with westerly wind) $6\frac{1}{2}^{\circ}$ at midnight. Here is a curious fact: The weather until ten P. M. was snowy, and at that hour it ceased to snow, the stars came out, and at midnight both moon and stars were visible. Sounded at noon in $23\frac{1}{2}$ fathoms blue mud, and the line showed we were drifting rapidly to the eastward before the westerly gale.

October 10th, Friday. — The curious fact of temperature recorded yesterday is repeated to-day. The temperature falls to $5\frac{1}{2}^{\circ}$ with S. W. by W. wind, and promptly rises to 30° with S. E. wind. The harder the blow the higher the temperature.

October 11th, Saturday. — A stormy day with a southeasterly gale. At midnight light airs came up from the northward, and a faint radial display of the

aurora in the N. W., from which I anticipate an increase of barometric pressure, and a fall of temperature to-morrow. During the day and until the wind went to the northward, snow fell. We have not had thus far any unusually heavy snow-storm, but these high winds blow the snow that does fall up into drifts, through which we unexpectedly flounder over knee deep. We do not seem to be affected, as far as the ship is concerned, by these high winds; she heels steadily 5° to starboard, and occasionally changes her head a point either way, but that is of course due to a motion of the entire floe in azimuth. Beyond an occasional trembling as a sudden gust strikes her, the ship is as steady as if she were in a dry dock, shored up; and whatever pressure may be exerted on the edges of our floe, it does not extend to our position within it. What were leads behind and ahead of us when we first pushed the ship in here have long since frozen over and have been covered with snow, and we detect them in high temperatures, say 30° , by sinking through the snow to the sludgy ice beneath and seeing water ooze up from its partially thawing surface. Our floe drifts around of late to the S. W., and I very much hope that when these blows are over (for when the barometer rises first from its present low point 28. 77, we must surely look for high winds), and the air gets clear of driving snow, we shall have a good view of this land to the southwest of us. An indicated drift this time to the N. W.

October 14th, Tuesday. — During the clearing of the atmosphere at noon we saw land very distinctly to S. S. W. (true). As we have had no observations for four days I cannot speak with certainty when I say that this land is not Herald Island; but it had not the now familiar shape of Herald Island, and extended too far in

azimuth for that celebrated spot. The air is yet so filled with snow crystals that judging of distance is out of the question; and our view not lasting over a half hour, with intervals of concealment, we put off guessing to a more propitious moment. Discontinued the daily hauling of the dredge on account of the small amount of the proceeds and their sameness. Fired up again on the Baxter engine, but Edison's generator failed to make a light. I am afraid this is irretrievably worthless, and our electric light this winter has remained, not gone, "where the woodbine twineth." Collins, however, hopes to make it work yet.

October 15th, Wednesday. — Already we are beginning to experience the moisture between decks common to Arctic ships. Although I was careful to have the cabin lined in England with felt, and the poop deck covered at Mare Island with three thicknesses of canvas, the upper thickness painted, my room shows beads of condensed vapor on every plank of the ceiling, and I suppose it will soon show in other places. I have shut off the after part of the cabin, and thus reduced the space to be heated. This after part is so cool that passing into it from the cabin is like stepping into a cold bath, but yet it is generally dripping with moisture. The temperature at which the cabin and berth deck are kept is 50° . The ward-room is as yet perfectly dry, and as it is used for sleeping only I have not considered it necessary to light a fire in that stove. The berth deck remains dry and comfortable. Of course there is difficulty about proper ventilation and keeping down the carbonic acid gas, but I am hopeful of being able to make everything as satisfactory as possible. Whenever I see a chance to improve matters, I do so. The deck-house is finished excepting the felt lining.

I have grave fears about being able to use the deck-house as a living and sleeping place for the crew this winter. I am afraid it will be too damp, and, considering the amount of fuel I can spare, too cold. We have stoves enough, of course, and fuel enough to keep the ship warm all winter, but my great object is to save fuel, so as to have some to steam a little with next summer, and enough to keep life in us next winter. Accordingly, supposing that the electric light would be a success (which I have no hope of now), I arranged for burning seal and walrus blubber as fuel in the Baxter engine, hoping to get heat from the boiler thereof to warm the deck-house at the same time light was supplied. As Edison's generator failed to give electric light, so did the boiler fail to give heat, to any extent. Clothes washed and hung up in the deck-house were as wet as ever, despite the sheet-iron jacket which ought to have radiated heat. The deck-house acted as a capital condenser for escaping steam. Failing the electric light, I must give up heat also from this elaborate machine, put up two stoves in the house, and fit drip pans so that blubber can be burned in them. We of the human race eat the seal meat, and the dogs eat the walrus meat, and the blubber is burned. Consequently, there is no waste.

To insure a proper changing of air on the berth deck I issue an order to-day to clear it daily from 1.30 to 4.30 P. M., and open all hatches and doors leading to it. To occupy the men profitably during that time, the watch below is armed with Snyder rifles and turned out to hunt for seal and walrus.

October 17th, Friday. — Collins' birthday. Bear caught in trap, but escaped, leaving a lock of his hair as a souvenir. Nindemann got a seal, and Aneguin added another to our larder. We have now seven seals hang-

ing in the rigging, which will in turn serve for as many dinners, while their own blubber may serve to cook them.

October 18th, Saturday. — To our surprise, the cook, Ah Sam, came to-day and asked for a gun to “go shoot a seal.” He was furnished with a Snyder rifle and ammunition, and he started off quite gayly. In about an hour he returned, the most astonished and startled Chinaman out of China. At his first shot the gun had burst, tearing up the barrel, fortunately near the muzzle, so that he received no harm; but his mental demoralization was complete. The probability is he let the muzzle slip in the snow at some time, and the end of the bore got choked; hence the bursting.

October 20th, Monday. — Highest temperature, 16° ; lowest, $3\frac{1}{2}^{\circ}$, — the lowest recorded thus far.

October 21st, Tuesday. — The thermometer commenced at $4\frac{1}{2}^{\circ}$, and at noon had fallen to zero for the first time this cruise. It continued to drop, however, at eight P. M. standing at minus $10\frac{1}{2}^{\circ}$ (light W. wind), whence it commenced to rise, ending the day at minus 4° . For the first time since the 10th, we have clear and pleasant weather with bright sunshine. Our days have become painfully shorter, the sun setting to-day at 3.45 P. M. Our views of him have been so rare that we missed him greatly, and even when he does come now his stay is short. Between noon and three P. M. we had a pleasant treat, thanks to the clear atmosphere and the sun’s low altitude. We distinctly saw land again, and unlike any we had seen before. From the deck it appeared like three islands, but on going aloft we were able to discover connecting land. The whole may be one large island with three peaks. The highest and clearest defined peak bore S. 28° W. (true), and may

be from sixty to one hundred miles distant. By 4.30 the atmospheric refraction was very considerable, and it lifted into view a high mountain, saddle peaked, and bearing S. 24° W. (true). Along the horizon was a layer of clouds 1° in elevation, above which the saddle peaks showed clearly.

At seven P. M., with the thermometer at eleven degrees below, our liquid steering compasses froze, and we removed them to the cabin, placing a boat compass in the deck house to keep a record by. The effect of this cold snap is to close up water spaces like magic. While out with the dogs this afternoon where had been open water, I could almost see it freeze harder and harder. Temperature, minus 8° .

October 22d, Wednesday. — Chipp and myself are beginning to experience the effect of cold in our rooms, everything kept hanging against the ship's side and forward bulkhead freezing fast to them.

October 23d, Thursday. — From 8.30 to 9.30 P. M. had our first experience of paraselene, — three mock moons at right angles to the real moon (owing to the moon's low altitude the fourth or lower mock could not be seen). Around the real moon was also a hazy arch.

October 24th, Friday. — To save the men's hands while hauling in the lead-line, we rigged to-day two standards alongside the fire-hole to support a reel, and fitted the reel with two wooden handles.

October 25th, Saturday. — To-day served out fur clothing to the crew, and got on deck two stoves ready for putting in deck house. Our steward, Charles Tong Sing, is sick since last evening with nausea. I hope and think it is a slight indisposition merely. He is invaluable, and does more work than would tire two men.

While he is sick his work is assumed cheerfully by Ah Sam, the cook, another invaluable man, and he performs the duties of both officers' steward and ship's cook with the same benign smile that used to rest on the countenance of our discharged friend Ah See, who described his next of kin as Ah Mo, Canton, China.

October 26th, Sunday. — At ten A. M. held the usual Sunday inspection. I was pleased to find the berth deck perfectly dry and warm. The condensation which formed on the after berths amidships, and in the two rooms opening off the berth deck, has been checked by felting, and I sincerely hope that we shall be able to keep the deck dry and habitable all winter. The forehatch opening into the deck-house has been entirely uncovered, and as a consequence all air entering the berth deck is warmed to some extent before reaching its destination. By my own observation and test there was last night a difference of 20° in the air outside and inside the deck-house (minus 10° , and plus 10°), and this without any fire there. All the air that ventilates the berth deck passes through the deck-house, down the forehatch, and through the sixteen one inch and a quarter holes in each door. This air is again heated by the stove until it reaches 50° , and it then passes off through the skylight, which is kept open, and so far acts as a perfect uptake. The cabin is generally kept at 50° , and the ward-room keeps without fire in the neighborhood of 32° . The temperature of the engine-room is 14° , and there is a small amount of frost on the iron. But as all our boiler pipes and tubes are dried out and the engines painted, no deterioration can occur. Highest temperature, minus 10° ; lowest, minus 17° . Weather clear and pleasant, and the low temperature is not cared for in contemplating a bright day. A movement has, how-

ever, taken place in the ice, but whether it is owing to a reduction of temperature or a reduction of pressure I cannot say. About five hundred yards ahead of the ship is a crack in the field a foot wide, and extending in a circular direction for half a mile, and five hundred yards ahead of that a crack six feet wide, and extending the same distance or more. In both cases the rent is a neat one; the water coming up within a foot and a half of the surface, but rapidly freezing in this temperature. Our hunters were out immediately in quest of walrus and seal, but beyond seeing, as they say, one walrus and a bear, accomplished nothing.

Held divine service at 10.30 A. M. I am glad to say that the steward's illness has proved nothing but a mild attack of nausea, and has yielded so readily to treatment that he is now around all right again.

October 27th, Monday. — Added two seals to our larder. In order to have sleds and provisions ready for an emergency calling for a hasty abandonment of the ship, I issued an order to-day to put five sleds in perfect traveling order; also an order in relation to winter routine, and but two cooked meals each day. The amount of coal consumed in the galley is too great to be kept up, when we consider the additional expenditure required in the deck-house, observatory, and perhaps ward-room, and the necessity for our steaming at least a little during next spring and summer. To observe carefully the effect of the winter on us, I also issued an order to the surgeon in reference to monthly examinations of officers and men. Discontinue after this date the taking of sea temperatures and water densities.

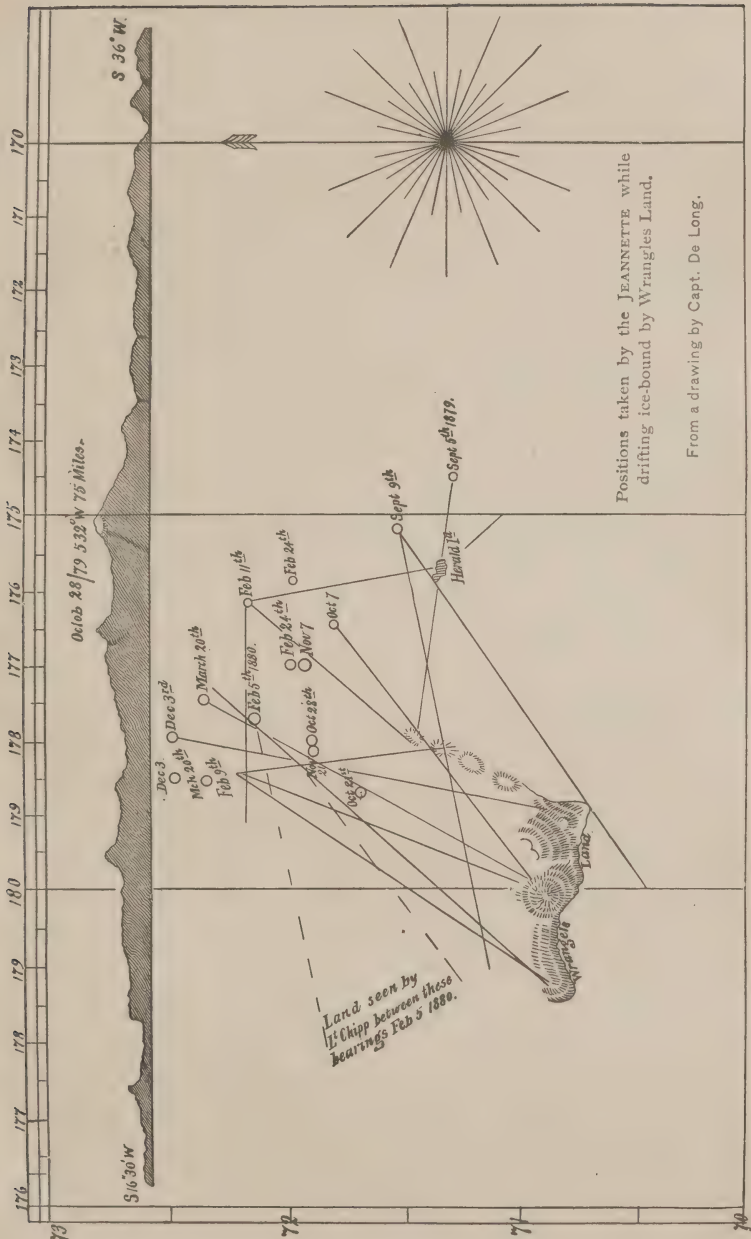
October 28th, Tuesday. — Thanks to a clear sky, this morning at four o'clock Mr. Danenhower got excellent

sights for our position, which he determines to be latitude $71^{\circ} 57' N.$, longitude $177^{\circ} 51' W.$, showing a general drift of twenty miles N. E. (true) from our position of the 21st. At the same time the magnetic variation was determined $23^{\circ} E.$ The sun rose at nine, and immediately thereafter high land was sighted to the S. S. W. (true), the extremes bearing respectively S. $16^{\circ} 30' W.$, and S. $36^{\circ} W.$,—the highest peak bearing S. $32^{\circ} W.$ The whole land seems to be about fifty miles distant. I believe this to be the north side of the land seen by Captain Long in 1867 (Wrangel Land), but I no longer believe it to be a continent. It is either one large island or an archipelago.

At four P. M. Mr. Dunbar, who had been away with Alexey, came back with the pleasing information that they had shot three walruses. Anxious to get this important addition to our dog food, Melville, the doctor, and myself started off with Sharvell and a dingy on a sled drawn by a heavy team of dogs to secure it. After a heavy drag over what Dunbar was pleased to call a mile (but which I think was nearer three) we reached the water, only to find that our three walruses had got lost among the young ice.

In accordance with the various orders issued yesterday, the winter routine, beginning on November 1st, will be as follows:—

- 6 A. M. Call executive officer.
- 7 Call ship's cook.
- 8.30 Call all hands.
- 9 Breakfast by watches.
- 10 Turn to, clear fire-hole of ice, fill barrels with snow, clean up decks.
- 11 Clear fore-castle. All hands take exercise on the ice.



Octob 28 179 532° W 75 Miles.

S 16 30' W

S 36° W

Land seen by
J. Chipp between these
bearings Feb 5 1880.

Positions taken by the JEANNETTE while
drifting ice-bound by Wrangles Land.

From a drawing by Capt. De Long.

Sept 9th 1879.

Harold 1st

Sept 9th

Oct 7

Feb 24th

Nov 7

Feb 11th

March 20th

Dec 3rd

Feb 5th

March 20th

Dec 3rd

Feb 5th

March 20th

Dec 3rd

Feb 5th

March 20th

Dec 3rd

Feb 5th

March 20th

Dec 3rd

Feb 5th

- 11.30 Inspection by executive officer.
12 M. Get soundings.
1 P. M. One watch may go below.
2 Fill barrels with snow. Clear fire-hole of ice.
3 Dinner by watches.
4 Galley fires out. Carpenter and boatswain report departments to executive officer.
7.30 Supper by watches.
10 Pipe down. Noise and smoking to cease in fore-castle, and all lights to be put out, except one burner of bulkhead lantern. Man on watch report to the executive.

During the night the anchor watch will examine the fires and lights every half hour, and see that there is no danger from fire. All buckets will be kept on the starboard side of the quarter deck, ready for use in case of fire.

I think the night one of the most beautiful I have ever seen. The heavens were cloudless, the moon very nearly full and shining brightly, and every star twinkling; the air perfectly calm, and not a sound to break the spell. The ship and her surroundings made a perfect picture. Standing out in bold relief against the blue sky, every rope and spar with a thick coat of snow and frost; she was simply a beautiful spectacle. The long lines of wire reaching to the tripod and observatory, round frosted lumps here and there where a dog lay asleep, sleds standing on end against the steam-cutter to make a foreground for the ship, surrounded with a bank (rail high) of snow and ice, and in every direction as far as eye could reach a confused, irregular ice-field, would have made a picture seldom seen.

October 29th, Wednesday. — Weather clear and pleasant, and a perfectly splendid evening. Full moon, bright starlight, and, as the day ended, not a cloud. Land seen to-day in greater extent than yesterday, and beyond the then bearings. Mr. Dunbar and Alexey started out early this morning to endeavor to find the missing walruses of yesterday. They took with them a team of dogs. On the way one of the dogs (Dandy, or Bingo) got out of his harness and escaped, much to the disgust of the other dogs, who attempted to chase him. Alexey in his peculiar language remarked, “Bom bye, other dogs him plenty whip” (for his desertion). After having failed to secure the walruses, the party returned to the ship. About a half hour after the return, the quartermaster came to me and reported that Bingo had been killed in a fight. Alexey’s prediction came true. Though three or four hours had elapsed, the dogs remembered the circumstance of the desertion, and finding Bingo at a safe distance from the ship had pitched into him and chewed him so badly before Erickson could reach them that he died within ten minutes of being carried on board ship, — the first death in our brute associates. We skinned him to have his coat for future wearing apparel, and his carcass lies frozen on the deck-house roof for possible food for his murderers.

October 30th, Thursday. — The doctor relates a curious dream he had last night. He seemed to be accompanying the survivors of Sir John Franklin’s last expedition on their journey to the Great Fish River, when suddenly he changed his base to this ship’s cabin, and began explaining to Sir John Franklin there present some of our articles of outfit, such as Edison’s electric machine, the anemometer, and the telephone. Frank-

lin, after listening to the explanations and viewing the articles, tersely remarked, "Your electric machine is not worth a damn, and your anemometer is just the same." The telephone he seemed to consider a good thing.

The electric machine, after having received Melville's attention, had been in hand for some days un-reeling and reinsulating, and reeling again the wires, and was now ready for another trial. Steam was accordingly raised in the Baxter boiler, and the generator connected; but though seventy pounds steam was applied, not a spark even could be obtained, nor a deflection in the galvanometer needle. The only effect was to fill the deck-house with the fearful smoke of burning blubber, and to make it dripping wet from condensing steam and the shower of rain falling from the roof. I concluded that time enough had been lost in trying to make this machine of use, and I would no longer keep the finishing of the deck-house in abeyance, and hence I ordered the engine struck below into the old galley-room, and cleaned and painted for laying by. Our telegraph wires are broken in several places this morning from their own weight, increased by a slight amount of frost. We have tried laying them in the snow, but it has rotted them through and through. Bare copper wire No. 24 is evidently not the thing. When we get our first heavy fall of snow I shall try running them again, but I begin to fear that Franklin is right in both his statements. The hunters brought in three seals to-day as a pleasant thing to contemplate after being disgusted with electric experiments, and at supper to-night we had a new dish offered us, — walrus sausage, — and a rare good thing it is. Bear, seal, and walrus are not to be despised, and I agree with Chipp,

who says that heretofore, when he read that men were subsisting on bear and seal, he believed they were having a hard time, but he will know better in the future.

October 31st, Friday. — The open water streaks are again closing up, the ice piling up to a height of some ten feet as the floes come together. Chipp has observed that these openings occur at full and change of the moon, and disappear at the time of neap tides. There may be a tidal action here, but as we are drifting around with the floe there is no chance for tidal observations. The weather has been so thick the last two days that we have seen nothing of the land. If we could only drift in near enough to it to land on it and explore it I should feel that we had accomplished something to keep us in countenance. It is hard that our first season should thus be passed in idleness.

November 1st, Saturday. — Began to-day the winter routine.

November 2d, Sunday. — Inspected the ship at eleven A. M. while all hands were on the ice for exercise. Having kept up roaring fires of blubber in the two stoves in the deck-house since yesterday morning, I was pleased to find that all the wet clothing had thoroughly dried, and that the deck-house was dry and comfortable; in fact, the temperature ranged between 60° and 70° at the forward end, the stoves being in the middle. At one P. M. mustered the crew and read the Articles of War. At the conclusion of this ceremony held divine service.

November 3d, Monday. — Discovered this morning a crack in the ice two hundred yards N. W. of the ship. It ran in an irregular direction for about one quarter of a mile, and was in places nearly twenty feet in width. The surface of the sides of the opening was but two

feet above the surface of the water, which had of course become ice. This is bringing these cracks too near home to be pleasant, and I sincerely hope no nearer openings will cause us to be uneasy in our now comfortable berth, where we seem as steady as in a dry-dock. A faint trembling of the ship in high wind, such as is now blowing (at midnight), is the only unsteadiness which we have. The doctor, in obedience to my order, commenced to-day the (to be) monthly examinations of officers and men, beginning with myself.

November 4th, Tuesday. — Carbonic acid test, taken at eleven last night on the berth deck, gave 2.3430 volumes per thousand, or 0.23430 per cent. This is the worst we have yet obtained. Medical examination continued and concluded. Until I get the surgeon's detailed report I cannot record results. In my own case, the only change I remark is a falling off in weight. My weight on sailing from San Francisco was one hundred and ninety-five pounds, now it is but one hundred and eighty pounds.

November 6th, Thursday. — A day of extraordinary interest and some anxiety. At nine A. M. we were disagreeably surprised at finding a large crack in the ice on the starboard quarter about two hundred yards distant, a small crack under and right across the stern, and a small crack leading from the stern for a hundred yards ahead. Although I could not account for them, I saw no reason to be uneasy, for we have had no high winds this month, and no pressure had occurred in our vicinity. At four P. M., however, Collins, who had gone on the usual hourly visit to the observatory and anemometer, came running back announcing that an opening had occurred in the ice between the observatory and tripod. We all hurried out and found a large rent, al-

ready four feet wide and widening, extending parallel with the ship's length to her starboard quarter, and thence across her stern, averaging one hundred yards in distance. We promptly removed the instruments (anemometer, thermometers, rain-gauge, barometer, and dip-circle, etc.) to the ship, setting them up there. The opening kept on widening, new ice forming immediately on the surface, and by midnight it was some twenty yards in width. Some premonitory crashes and groans of the ice added to my anxiety lest some fissures should occur in our floe and make our position serious. But we did not move an inch, either in our angle of heel (4°) or in azimuth, and at midnight we have nothing worse to contemplate than an opening one hundred yards off.

Dr. Ambler handed me to-day his report of the medical examination. He considers the examination as very satisfactory. Of the thirty-three persons on board, the general condition of twenty-three is pronounced "excellent," of eight "good" (I am among this party). To my surprise, however, seven say they do not get enough to eat, or sometimes do not get enough; of these seven, four are in the cabin mess. Of these four, two have enough in quantity, but as some things are not cooked in a shape to their liking they do not eat the full ration. The remaining two have neither sufficient in quantity, nor liking for some articles served.

I give the bills of fare and weights of articles of food (see Appendix D), and I believe that both in quantity and variety it is superior to any previous Arctic experience. The surgeon expresses his opinion that it is all that is necessary in both respects. However, rather than any one should consider himself as underfed I shall probably increase the rations. If we could only get a clear day we should probably find our-

selves much nearer to land than we have been heretofore.

November 7th, Friday. — During the night the opening closed under seeming great pressure, for at day-break, say eight A. M., the ice was piled up in great heaps on the edge of our floe, which was of sufficient strength evidently to bear the brunt. The pressure came from S. S. E., the line of the crack being N. N. E. and S. S. W. true, and since our floe was the stronger, the pressing floe rode up on top of it, breaking off, and leaving its own edges in a muddled pile. The thickness of these edges was by actual measurement 7 feet 10 inches, 6 inches being snow on the surface. Some of the pieces were pea green, or sea green rather, and some light blue, and in several places showed a muddy and dirty side as if they had been in the mud or had stranded on a beach.

Not knowing very well what was going to happen, I watched this ridge with considerable interest. We had had since midnight a decreasing S. W. wind, but at ten A. M. it became perfectly calm. About eleven A. M., to our surprise, the pressing floe receded, leaving a space about ten yards in width from floe to floe, and through this the ice began to set to W. and N. as through a gorge, with a velocity of about half a mile an hour. The pressure became very great. The smaller pieces passed on readily enough, but the large hummocks or broken floe pieces would occasionally jam against our floe, and being pressed from behind by the confused mass would exert an influence on our floe that made it groan and crack and move under our feet. This mass was flowing not over fifty yards from the ship, then heading east northeast, and as it crushed and groaned along, and our floe throbbed and shook with the strain brought upon

it, I almost momentarily expected to see the ice split in all directions around the ship, and the ship herself be carried along with the tumbling heap. Nothing of the kind happened, however, thank God, and about four P. M. the motion ceased. The ship had not moved an inch. Five sledges stood packed on the poop, with forty days' provisions for men and dogs, but these might have availed but little. In fact, I doubt if they would have stood the racket of being dragged over rough ice with their weights. Suspending, therefore, other work, we commenced the construction of two strong sleds to carry our dingys.

Our floe must have moved; for to-day we are in twenty-three fathoms. The openings in the ice exposed so much water to the action of the cold air that we have had all day a thick fog, highest temperature plus 3°, lowest minus 10°.

November 8th, Saturday.— A quiet day and a relief to the anxiety of yesterday. Still I cannot help feeling more or less uneasy. The line of broken ice is so near us that I fear we may have some trouble at the next gale of wind. All the commotion of yesterday occurred with calms or light airs. Had it been at regular periods, it might have been considered due to tidal action; but as it occurred only once in the twenty-four hours that idea must be abandoned. Some resisting field of ice has given way, and the rush was the result. If we consider that rush accelerated by a gale of wind, it is not difficult to realize the peril of a ship carried along by it. Drifting with it might not be so bad, but the hanging of the ship on an impediment while this surging and grinding mass was pushing against and perhaps over her would at least not improve the situation. My fear is, therefore, that if we have a gale of wind be-

fore all these broken floes can become cemented together, the whole mass will get in motion again and our floe may split up, set us adrift, and plenty of trouble be ahead of us. However, we must wait and see. Human foresight is of but little avail. Aid from above is all that can prevail, when a ship is drifting in an ice-floe.

Sighted high land between S. and S. S. W. for a few moments about eleven A. M., but too indistinctly to recognize it as anything we have seen before.

November 10th, Monday. — A large water hole to the E. S. E. giving off vapor upon coming in contact with colder air. Sounded at noon in 17 1-2 fathoms. At noon sighted again the land seen on October 29th and on the same bearing. At three P. M. grinding and pressure began again, our floe this time cracking and breaking up to within one hundred feet of our star-board beam and quarter. From eight P. M. to midnight a fine auroral display, beginning with swirling tails from N. to E., and ending with radiating bands extending from a central point at N. to N. E. and N. W.

November 11th, Tuesday. — A day of great anxiety. At 6.10 A. M. I was awakened by the trembling and creaking of the ship, and almost immediately the man on watch came in my room to inform me that the ice was again in motion. Hastily tumbling out and dressing I went out on the ice. The grinding and crushing flow of ice to the westward had again commenced, and the jamming of large pieces from time to time, splintering our floe, caused breaks and upheavals to within about seventy-five feet of the ship. The ship groaned and creaked at every pressure until I thought the next would break her adrift. The pressure was tremendous, and the noise was not calculated to calm one's mind. I know of no sound on shore that can be compared to

it. A rumble, a shriek, a groan, and a crash of a falling house all combined might serve to convey an idea of the noise with which this motion of ice-floes is accompanied. Great masses, from fifteen to twenty-five feet in height when up-ended, are sliding along at various angles of elevation and jam, and between and among them are large and confused masses of débris, like a marble yard adrift. Occasionally, a stoppage occurs; some piece has caught against or under our floe; then occurs a groaning and cracking; our floe bends and humps up in places like domes. Crash! the dome splits, another yard of floe edge breaks off, the pressure is relieved, and on goes again the flowing mass of rumbles, shrieks, groans, etc., for another spell.

Our performance lasted only for half an hour this time. At its conclusion I was startled to find that a break had occurred in the floe across the bows of the ship running towards the southwest, and that a projecting floeberg was plowing its way like a wedge to break up the floe ahead of us and make a junction with the old stream. In this case we should be in the centre of an island, small at that, whose edges would be worn away on all sides until we were left alone to be hurried along in the race. At 4.20 P. M. the excitement began again, and this time we had it heavily for four hours. I fully made up my mind that we must go adrift. Hurriedly we broke up our temporary observatory near the ship and took the instruments on board, suspending our meteorological record while graver matters required our attention. Everything movable was brought in, and finally the dogs were with great difficulty collected and brought on board ship, a proceeding which they did not like, and which they resented by jumping over the rail on the ice again, until we boarded it up so high they

could not clear it, and then they relieved their minds by fights among themselves.

This movement of the ice begins to make me believe it is a tidal action of some kind, although it flows in but one way — to the westward. Fearing another rush during the night, I ordered everybody to hold himself in readiness for immediate action, sleeping myself with my clothes on and knapsack handy in case of accident. As is usual nearly every day we had light, drifting snow.

November 12th, Wednesday. — At 4.15 A. M. Mr. Newcomb, who sat up until this hour, roused me with the information that the ice was again in motion. Rushed out on deck and found that we were in for a lively time. The pressure was greater than ever before in our experience. To the ice rushing and growling alongside of us I did not pay much attention, for though our floe humped badly, and cracked and split in all directions, there was not much obstruction to the flow of ice. But the break in the floe across the bows gave me serious concern, for I saw the piled-up ice advancing toward us seemingly as fast as a man could walk. Abandoning the line of union which it yesterday tried to make diagonally across the bow to the flowing stream on the port quarter, it bore down directly upon us. At each grind of the advancing mass it piled up floebergs in front of it, and the ship shook and trembled like a reed. From my post on top of the deck-house the view was magnificent though awful. I fully expected we should be swept away into the grinding stream, and as the approaching ice made one more startling advance than usual, I grasped the mainstay to keep my place when the final crash should come. All hands had been called and stood ready, although there was really nothing to

be done. When at 6.25 the advancing wall was twenty-five feet from the stem, the pressure suddenly ceased, and everything was quiet again. At seven the first signs of dawn made their appearance, and as the increasing daylight made objects evident to our eyes, it was a startling spectacle to see the confused wreck that had been made of our once smooth floe. The dogs, which had been carefully brought on board at the first warning, were now liberated again to the ice, where they flew around with all the gayety of children let out of school.

At nine A. M. land was seen on the bearings of October 29th, and recognized as our so-called north side of Wrangel Land. I was exceedingly anxious all day, for I counted upon the usual afternoon tidal pressure, which I fully expected would finish the work begun and almost completed this morning. But to my great surprise not a movement occurred, and I again kept my clothes on all night ready for a startling call. Highest temperature minus 11°; lowest minus 24°. Sounded at noon in eighteen fathoms (blue mud).

November 13th, Thursday. — Aroused at two A. M. by a loud crack under the ship. Collins, who ran out to examine, reported that he saw no signs of trouble, except a number of small cracks across the bow, and the fact that the rent leading out from the stem had opened to an inch in width. I concluded this would prove a forerunner to a morning's excitement, but again I was pleasantly disappointed. Not a thing disturbed us for the remainder of the night, and the day wore on, afternoon came, and still no trouble. The meteorological instruments were put out on a temporary observatory hill near the ship, and I began to hope that we might have a few days' peace. At eleven P. M. I went out to record the

temperatures and anemometer, and stood on the hill a few moments regarding a beautiful auroral arch extending from E. by S. to W. by N., the crown being 70° in elevation and bearing north. Hearing a few little crackles, like a dog walking over snow, I looked around to see which dog had followed me, when I descried two men running over the gangway and racing for the stem. I ran there at once, and to my amazement saw the ice float away to the northward along our whole length, leaving nothing but water on our port side. In twenty minutes we had one hundred and fifty feet width water on our port side, — the split occurring in as neat a line with the keel as if the keel had cut it, the ship remaining fast to the floe along her starboard side, not even a crack being made in her snow wall. The whole port side, snow wall intact, just slid away without noise or excitement. Four of our dogs which lay asleep on the floe were not awakened by the movement until the ice was nearly one hundred feet away, and then they could not get back, our hands being too full in getting our things aboard to send for them.

The meteorological instruments were once more hurriedly gotten on board; the dogs, except Tom and his three companions, collected and penned on the quarter deck; both dingys got up on the roof of the deck-house, the steam-cutter dug out of the ice and placed on the roof likewise, the tripods taken in, all boats cleared away ready for lowering, the port after clew of the quarter deck awning triced up ready for passing out provisions, etc.; and by midnight nothing belonging to the ship remained outside of her.

S. W. winds until eleven P. M., when calm. Barometer rises from 29.74 to 29.82. Highest temperature

minus 10° , lowest temperature minus 15° ; sounded at noon in twenty fathoms, blue mud.

Kept everybody in his clothes ready for a call, piping down after serving out hot coffee forward and hot tea aft.

November 14th, Friday. — Nothing occurred to disturb us during the night, although of course anxiety as to what might occur at any moment did not allow us to get much sleep. I sincerely pray that we are not going to have the experience of the Tegetthof in her long and perilous drift in the pack. This steady strain on one's mind is fearful. Seemingly we are not secure for a moment, and yet we can take no measures for our security. A crisis may occur at any moment, and we can do nothing but be thankful in the morning that it has not come during the night, and at night that it has not come since the morning. Living over a powder-mill waiting for an explosion would be a similar mode of existence. Our nights are beginning to be very long. To-day the sun rose at 10.30 A. M. and set about 1.30 P. M. Twilight on clear days begins about seven A. M. and ends at five P. M., giving us fourteen hours black night. Before many days the sun will leave us altogether, and we shall have a long spell of waiting for his reappearance. Daylight this morning showed us that our port floe with its snow wall was five hundred yards to the northward. It first moved to the eastward, then to the westward, and finally came to a stand opposite its proper place alongside the ship, and five hundred yards distant. Ice formed four inches in thickness in the fire-hole during the night. As the sun came up we again saw our "north side of Wrangel Land," between S. 40° W. and S. 6° W. bearings. And we again sighted our old friend Herald Island, bearing S. 49° E., all bearings true.

November 15th, Saturday. — A day of complete quiet as far as ice is concerned. The open water on our port side has frozen over sufficiently to bear walking upon it. Alexey was accordingly sent to the opposite side for Tom and his friends, and he brought the three (not four) missing dogs back, to my great satisfaction, and no doubt to theirs also, for they seemed glad to return to the land of dried fish. Not that they had hungered during the separation, for Alexey says he saw a lot of bones where they were, which these dogs had no doubt saved in times of plenty and buried in the snow for future emergencies. The remaining dogs were very indignant at the absent but returning ones, and had they not been prevented would have given them a fight as a celebration, looking no doubt on the enforced separation as some new dodge for shirking work. Finished to-day making sleeping bags for all hands.

November 16th, Sunday. — At eleven A. M. held my usual inspection. Found everything dry and comfortable below. At one P. M. held divine service. The S. E. wind which sprang up yesterday blew with great force during the night with terrific squalls; and though its velocity for a whole hour was no greater than seventeen miles, at times it must have been at the rate of fifty miles. It continued blowing during the day, and I stood by from midnight for some exciting result. We are seemingly resting in a cradle made under the ship in the neighborhood of the foremast, and which has not been sufficiently disturbed by our port floe leaving us to set us adrift; for although the heavy wind has been blowing on our starboard bow (its best hold for shoving us off), we hang on bravely. Should large masses of ice come grinding along our port side, it will be a ques-

tion of endurance as to our retaining our present place. The view to port therefore receives our greatest consideration.

At 2.30 P. M. the young ice alongside of us commences to split, and immediately the floebergs commence to make down on us. Jumping on the deck-house I view the procession with some anxiety. By great good fortune a projecting piece of our starboard floe holds on and fends off the floating pieces, and this push, aided by the wind, carries all dangerous masses just clear of our port side. Just astern of us there happens to be a bight in the floe, into which the drifting ice goes quietly and comfortably, and the open spaces being soon filled up the movement ceases about three.

To-day the sun left us, although for all the good he did he might have left yesterday. The weather was so cloudy that we had nothing more than daylight. In seventy-one days we will be looking for his reappearance.

November 17th, Monday. — Ice quiet during the day.

November 18th, Tuesday. — At six A. M., with a light northern wind, the ice got under way again and jammed along to the N. W. The pressure across the bows was very great, and this time the grinding mass fairly reached the stem. I surely expected the ship to be carried along with it, but a heavy beam pressure held us up against our floe, and the barricade was switched off at an angle. The pressure lasted until noon, the ship creaking considerably, rising a little, and heeling over $4\frac{1}{4}^{\circ}$ to starboard.

November 19th, Wednesday. — From six A. M. to noon heavy ice pressure on port quarter and beam, increasing our heel to 5° . From six to seven P. M. heavy beam pressure.

November 20th, Thursday. — Beyond occasional slight

pressure, which increased our heel to starboard to 6°, we have a day of no uneasiness. That is to say, we are not momentarily expecting to be turned away from our floe and sent grinding along with a stream of drifting floe lumps, or looking for a breaking in of our side by immense pressure. But as I cannot help realizing that we are in an exposed and dangerous position, and that either of the foregoing catastrophes may occur at any moment, I cannot be said to enjoy quiet or peace of mind. Sleeping with all my clothes on, and starting up anxiously at every snap or crack in the ice outside or the ship's frame inside, most effectually prevents my getting a proper kind or amount of rest, and yet I do not see anything else in store for me for some time to come. This pack is likely to have some motion all winter I suppose. So long as there may be water down by Behring Strait there will be space for relieving the pressure. But when the outlets close up and pressure continues, whether by wind or tidal action, the humping and piling up will go on around us and keep us in a constant state of turmoil for months to come. Truly this is no pleasant predicament. Wintering in the pack may be a thrilling thing to read about alongside a warm fire in a comfortable home, but the actual thing is sufficient to make any man prematurely old. Since we have become surrounded by ice again, and could hardly move very far or very fast, I have allowed the dogs to remain on the floe again to our mutual satisfaction. Though a few luxurious ones prefer seeking the shelter of the ship, the majority prefer living in the open air; hence our attempt to bring them on board only resulted in a series of fights and violent attempts to break away again. Once on board it would take four men to keep one dog from breaking for the ice, and there have been

frequent escapes. The other night one of the stragglers was taken by Collins to be a bear. A rifle was hurried for, but the "bear" had left fortunately, else we might have had a dead dog on our hands. Last night one of them fearing an imprisonment must have sought shelter on the ice lumps on the port side. At all events he was there this evening; and the ice having moved off a few feet from us, leaving a water hole, he could not come back the way he went, and would not come by any other in spite of our coaxing. While walking on the ice alongside I heard a subdued "yelp" under the bow, and rushing there I was just in time to plunge my hand in the water, and save our canine friend from going under for good. He was pretty far gone and remained in a dazed condition for an hour or two after I hauled him out.

November 21st, Friday. — Slight pressure in the forenoon, after which the ice recedes, leaving a line of open water on our port side. Sight the land again on its accustomed bearings. Bright moonlight and starlight. At twelve midnight a bright halo around the moon about 2° in diameter, and showing prismatic colors, the crimson on the outer edge predominating. The low temperature fills the air with frost dust, through which the moon's rays are prismatically seen. Position at seven P. M. shows a drift since November 17th of twenty-two miles W. 4° S.

November 22d, Saturday. — The day begins with a calm, but at three A. M. a N. E. wind sets in, and blows until midnight with varying velocity, the maximum being thirteen miles. The barometer falls alarmingly fast from 29.72 to 28.88, and the temperature rapidly runs up from minus 17° to plus 10° . The wind blows in heavy squalls at times, but I see no indication

of very bad weather until perhaps when the barometer begins to rise again. Sounded at noon in twenty-three fathoms, and the lead line indicated a drift to the westward. We experience a slight pressure under stern from floes which have advanced from the southward to cover up the vast expanse of open water which has been on our port beam.

Alexey and Nindemann while out this afternoon fell in with a bear and her cub. Alexey shot and killed the bear, and had a lively tussle with the cub, in which he got his clothes torn. The ice was so uncertain, and it was so late, three P. M., when Nindemann got to the ship to report the shooting, that I did not run the risk of trying to get the dead bear to-night, and accordingly sent the metallic dingy to bring Alexey back, leaving the game until to-morrow. "Plenty jump," says Alexey.

November 23d, Sunday. — The day begins with N. E. winds, which change to S. E. and back to N. E. with a velocity varying from three to thirteen miles an hour, during which the barometer steadily falls to 28.79, and the temperature rises to plus 24°, making it uncomfortably warm while exercising. At nine P. M., after a short calm, the wind comes out suddenly from the S. W. with a velocity which almost immediately amounts to twenty miles an hour, and causes the temperature to fall quickly to plus 5°. The weather, which before the shift had been overcast and hazy, clears so that at midnight we have the benefit of moonlight and starlight.

A few pressures during the day are the only things which disturb us. At one P. M. the advancing floes pile up the ice under the bows, and I have no doubt that this will serve as an entering wedge which, aided by the wind on our starboard beam, will, before this

southwester is over, break us out of the bed where we have so snugly lain for over two and a half months. Nindemann and Alexey started off in pursuit of the bear shot yesterday. But owing to the opening of the ice in the mean time they were unable to reach the place of the conflict.

Inspected the ship at eleven A. M., and held divine service at 1.30 P. M.

November 24th, Monday. — It has come at last; we are broken adrift from our floe! Suspecting what the continued action of this S. W. wind would be, I made sure to have all the dogs securely housed on board ship before I went to bed last night, *i. e.*, before I lay down in my clothes to get some sleep. At five P. M. I was aroused by a preliminary pressure under the bow. Turning out I reached the deck-house top in time to see a very severe nip which started our port bulwark planking, the ice being already piled higher than our port rail in some places. The ice under the bow was piled up as high as our figure-head, and the pressure in this direction was increasing. A floe piece with a wedge shape had pierced "our" floe, and was exerting its force bravely. The ship creaked and groaned. Something had to give, for the pressure from ahead and abeam was very great. Suddenly the ship lifted by the stern, the wedge advanced, and our floe was split, and the port pressure decreasing we were afloat on an even keel once more. The port floe moved slowly to the N. E., and we followed it, our snug cradle of two and a half months being split and shattered, and no longer our refuge and our strength. All our effects being long since removed we had nothing to bring in but our gang-plank, which was soon accomplished. Throughout the day we remained nearly in the same place, resting at

one time against one floe, and at other times against another.

The S. W. wind blew with a velocity between twenty and twenty-six miles an hour, changing occasionally to W. S. W.; towards midnight it moderated to fifteen miles an hour. The barometer steadily rose from 28.95 to 29.63. The highest temperature was plus 2.5° ; the lowest minus 5° . The air was filled with falling and drifting snow all day. Sounded at noon in twenty-two fathoms, and observed our drift to be to the northward and eastward.

November 25th, Tuesday.—The S. W. wind piped up again after midnight, and blew with a velocity varying from twelve to twenty miles until eleven A. M., when it went to west, remaining there until midnight, blowing with a velocity varying between twelve, seven, and three miles. The barometer rose rapidly from 29.64 to 30.32,—so rapidly, in fact, that I am suspicious of it, and inclined to look for some more bad weather. Highest temperature minus 3.5° ; lowest minus 12° . Bright moonlight and starlight. Sounded at noon eighteen and one half fathoms.

To-day has been one of the most anxious and exciting days we have yet had. At 6.15 a slight pressure on the port bow commenced hostilities. At 9.15 a very heavy squeezing on port side started our bulwark planking, and pinching down under us heeled the ship 3° to port. At ten A. M. the pressure ceased, and we were left floating upright in a small lead of open water, and adrift as far as any floe ice was concerned. For a time I was undecided what to do. There was no floe near us large enough to anchor to securely, and the chance of another pressure coming while the ship was tied up and unable to give to it was too unsatisfactory. If the

ship were free when the ice moved she would go along with it; if she were tied up she might have to stand the brunt in a very unfavorable position. As it was, she lay in a kind of canal a little wider than her own length, and ready for action ahead or astern. I concluded to let her remain so, and watch for results. At five P. M. I noticed that she commenced floating stern first through the canal. About a mile astern (E.) was a large patch of open water, and from ahead (W.) the broken floe pieces were gathering away and coming down upon us. At a little bend in the canal her stern took the floe and held fast, while her bow payed around as prettily as if we were casting under jibs. No sooner had she got stern to the wind than the advancing ice was upon us, and we were pushed, forced, squeezed, driven through this mile of a canal amid a grinding and groaning of timbers and a crashing and tumbling of ice that was fearful to look at. Still we sailed on, and in a half hour or so were sent out into the opening beyond where our speed decreased, and drifting over toward a thin floe we ran our bows into the young ice and held fast heading S. Though we moved at no time with greater speed than say two knots an hour, our passage through that sluiceway of running ice was enough to make one's hair stand on end, and each of us heaved a sigh of relief when it was over. If we had in the morning planted an ice-anchor to a small floe, I am convinced this pressure would have torn us away from it, and the stream of flowing ice might have jammed us across this canal and given us some injury, even if it had not climbed on board. Having a bright moon, nearly full, we could see, and that was a great comfort. I could not help thinking how much worse it would have been on a dark night, when we could have heard

all this trouble and yet have seen nothing. What one can see, he can to some extent prepare for; but it is the unseen danger that strikes the most terror to the heart. A man must be a hard unbeliever who does not recognize a divine hand in these wonderful escapes.

A most beautiful effect was created to-night by the moonlight reflected or refracted from the floes. A pure golden light was thrown around and above the ice, making one believe he was looking into fairyland.

November 26th, Wednesday. — My suspicions at the sudden rise of the barometer yesterday were correct, for to-day we have had and are having a snorter from the S. E. The day opened calm, and so continued until four A. M., when a light S. E. wind came up. This slowly freshened, until at noon it was blowing with a velocity of eight miles an hour, and at one P. M. the gale burst upon us, blowing twenty-one miles the first hour and reaching twenty-nine miles before midnight. The barometer rose to 30.27 until the wind freshened, when it began to fall, reaching 30.28 at midnight. The weather had a hard and angry look, and I see we are in for a screamer. The temperature began at minus 9°, but rose to plus 10° as the day ended.

The ship held fast in the young ice in which she ran last night, but shook from truck to keelson as the heavy gusts took her. A few water holes were in our neighborhood, and the main solid pack could be seen in all directions. This bay will no doubt close as soon as the ice takes up its motion again, which I have observed occurs when there is little or no wind. The heavy winds pack up the large masses, and in the calms and light winds, the pressure being removed, everything struggles to get back again to its old condition, and openings and races occur. Sounded at noon in

twenty-one fathoms (soft bottom). Sighted land on the same general bearings of October 29th.

November 27th, Thursday. — The wind went to S. S. E., and blew all day very hard, its velocity ranging from twenty-five to forty miles an hour. The squalls were very heavy, and though we moved only about half a length astern (to leeward, where we brought up against young ice), the ship shook as if her spars were coming out of her. At midnight the gale continued in full blast. The lead line showed a drift to the N. W. Evidently all the ice is drifting the same way, for the shores of our bay do not seem to contract much, and so I suppose there must be some large water space to the N. W. into which all this ice is drifting. If it brings up anywhere before a N. W. wind can stop its way the pressure down here will be tremendous, and our open bay will shut up like magic, in which case we must prepare for more anxiety.

Since being beset to the present time, though we have had difficulty in getting snow pure enough to make drinking water, we have not been absolutely unable to do so. But now there is so little snow remaining in our neighborhood that we are in a serious position. Very little snow has fallen thus far, and we have subsisted on drifts; and as we are away from drifts now, and cannot reach any, we have been forced to come down to scraping the floes around us. The snow resulting is quite salt, and our tea and coffee to-day are quite unfit to drink. It is not safe in our present condition to send men away any distance, for if the ice breaks up (and fissures are to be seen in all directions) we might go adrift again and have more than we could do perhaps to get the men back. Took the temperature of a small lane of water alongside at midnight and found it 27°.

November 28th, Friday. — Very hard blow from S. E. all day until towards midnight, when it slackened up a bit. At midnight, however, it commenced piping up again at S. E. by E., promising another installment of the gale for to-morrow. Stars of the first magnitude were easily seen to-day at one P. M.

There being no chance of getting snow of proper purity, we got up the Baxter boiler to-day, and, rigging a coil to it, commenced distilling. I am afraid this will be an expensive business in the way of fuel, but it cannot be helped. The snow that we have been able to get for the last two days has been so salty that many of the officers and men are being treated for diarrhoea. This, of course, will never do, and pure water must be obtained at any cost. We are all feeling the lack of exercise very much. The ice is so treacherous that it is unsafe to get on it. The poor dogs also feel the confinement, and when they are not engaged in a cheerful fight go moping around in a desolate way. They have regular cliques, and occupy certain portions of the quarter deck exclusively. Any trespass brings on a fight inevitably.

November 29th, Saturday. — A day of wearing anxiety. The gale continued, varying between E. by S. and S. E. At seven A. M. the ice commenced to move, and seemingly to windward, as if the pressure were forced back on itself. As we lay broadside to the movement we had the full force of it on our frame. The ice on our port side (the weather side) seemed tougher and more unyielding than heretofore, and the whole mass made our ship snap and creak with the squeezing worse than ever before. Several times the pressure became so great that the ship ceased to creak, and the deck seemed ready to burst open. To leeward

of us one large sheet of ice would ride over another large sheet, and the two come down against us; the port floe would decline to yield; the two sheets to leeward would break edges and pile up blocks against our starboard side, and then begin pressing against these; the ship would groan and squirm and then seem dead, while the deck trembled. This might last half an hour, and when it seemed as if wood and iron must give, the port floe would hump up and split, and we would be pushed on for another nip. This sort of thing lasted until three P. M., and then the nip seemed to be hardest of all, and remained so. We could not tell whether it let up or not, for we were jammed tight, heeling $2\frac{1}{2}^{\circ}$ to starboard. The ship could not rise, for the ice was only a foot thick, and took the ship's side above the bends only; it was simply a question of its going through her, or of her being strong enough to stand it. She was strong enough, and that is all we can say. If she had not been strong enough she would have been cut in two. Eight hours of this mental tension is enough for one day.

November 30th, Sunday. — A day of peace and quiet doubly acceptable after the strain of yesterday. The gale blew itself out at six A. M., and we had a bright moonlight and starlight until the struggling daylight came into play at nine. Of course, we do not see the sun at all, and our noon is but the twilight of ordinary latitudes. Occasionally it is beautiful indeed, as, for instance, to-day, when we had a few golden and red streaks in the S., a clear blue sky to about 20° in arc, and the remainder of the heavens dark blue, illuminated by a full moon. Venus was visible at noon. The ice around us made a picture in its lights and shadows. The broken pack surrounded us in all directions, while,

as if in the centre of a frozen lake, the *Jeannette* lay squeezed by slabs of ice eight and one half inches thick, with humped up and splintered floes, showing where she had proved her strength.

Attempts to be poetical in the Arctic are praiseworthy, but I think I shall give them up. My sensations of being in critical situations are too keen to allow me to write in cold blood about the beauties of ice scenery. I will simply remark that the pack is no place for a ship, and however beautiful it may be from an æsthetic point of view, I wish with all my heart that we were out of it.

We were able to resume our exercise of two hours, which was a great benefit and comfort to us. Sounded at noon in thirty-two fathoms (blue mud), and a drift to the N. and W. was indicated by the lead line. A raven, which flew around the ship, was brought down by a rifle shot by Aneguin, and added to the naturalist's collection. The loom of land was seen to the S. W. At eleven A. M. inspected the ship, and at one P. M. held divine service.

By two lines of position obtained from observation of the moon and Mars, Danenhower determines our position at 7.30 P. M. to be latitude $72^{\circ} 36' N.$, longitude $178^{\circ} 08' W.$, from which it appears that since November 21st, the date of our last observations, we have drifted forty miles to the N. $1^{\circ} W.$

I take leave of the month of November without the slightest regret. It has been a month of gales, ice pressures, and discomforts mental and physical. Earnestly hoping that December will drift us quietly and peaceably nearer the Pole, and bring us to some land where we can at least have the merit of discovery if not of exploration, I say good-by to November, and invoke God's blessing on our ship and ourselves.

CHAPTER VI.

THE DEAD OF WINTER.

December, 1879 — 26 January, 1880.

Auroral Displays. — Daily Walks. — Trouble with Water. — The Darkness. — Monotony of Life in the Arctic. — Tests of Light. — Discomfort. — The Shortest Day. — Christmas. — Tidal Action. — The Old Year and the New. — Festivities. — Danenhower's Misfortune. — A Cold Snap. — A Leak. — Serious Business to close it. — The Pumps. — Reappearance of the Sun.

DECEMBER 1st, *Monday*. — The clear and beautiful weather of yesterday continues to-day. The barometer rises from 36.36 to 30.56, an unusual circumstance, and one worthy of attention as to its results. These areas of high and low pressures follow each other like waves, and bring us generally quite as bad weather in the high as in the low. The atmosphere is remarkably clear, and sounds made on the ice, while being transmitted to great distances, seem to reverberate like sounds made under a large dome. The human voice has all the intensity noticed when one speaks in an otherwise empty hall or in a cave. The highest temperature was plus 4°; the lowest minus 5°. A halo was about the moon. A mirage to the southward of an open water space was very clearly defined in the sky.

Sounded at noon in thirty and a half fathoms (blue mud). Ice quiet and ship remaining immovable.

The usual monthly physical examination of officers and men was begun to-day. I shall notice with much

interest the result. I can see no change for the worse from ordinary observation. We have at times been troubled by not getting pure snow for drinking and cooking purposes, and as this may continue until we have a heavy snow-fall (for our distilling is not perfect) I shall commence to-morrow the issue of a ration of one ounce lime juice to every officer and man each day.

December 2d, Tuesday.—A quiet day. We had, in addition to one of the most beautiful moonlight effects on the ice I had ever seen, and a sky perfectly free from clouds, a fine chance to witness auroral and other effects. At ten P. M. a lunar rainbow was visible, showing faintly the prismatic colors. Towards eleven P. M. this was succeeded by a lunar halo in which the prismatic colors were clearly visible. Then flared up an auroral arch, extending from N. to N. E., whose crown was 34° in altitude, and this arch, as if by magic, absorbed the lunar halo, or caused it to disappear. Then suddenly the lunar rainbow reappeared and arched alongside the auroral arch; and finally, at 11.50, the auroral arch became an auroral curtain, floating sheets of trembling flame down to the horizon. Not a sound was heard during all this display. Add to this picture the ship thrown by the bright moonlight against a clear, dark blue background, every rope and spar white with frost, and a level floe surrounded with a fringe of fantastically shaped hummocks, and it would make a study for an artist. I have remarked heretofore that these wonderful auroral displays are forerunners of cold weather, and I shall watch with interest the result of this very high barometer and extraordinary atmospheric phenomena. Very probably we are lulled by a false sense of security while the ice is so quiet, but I shall undress before retiring to-night, a thing I have done but once since November 13th.

Commenced the issue of lime juice to-day. For the officers it is placed on the dinner-table with water and sugar, and each one sweetens or waters it as he pleases; with the men it is served out by Sweetman, and an ounce of sugar is furnished at the same time, and as the men go to dinner by watches they each receive and consume the ration.

December 3d, Wednesday. — The report of the surgeon's examination is very satisfactory. Of the eight officers the condition of six was pronounced excellent, and of the remaining two (myself and the doctor), good; of the twenty-three men, twenty excellent, and three good. A day of beautiful weather, and although we hear the rumbling of the ice in the distance, nothing occurs around us to disturb us.

December 4th, Thursday. — Were it not for our daily walking exercise of two hours I fear we should stagnate. From eleven A. M. to one P. M., however, all hands are sent out of the ship. The officers generally walk, and the men go hunting, without success, or kick foot-balls. We have a fine, level, smooth place, two hundred and forty yards in length, to walk on, and we manage to put in from four to six miles in the two hours. This is the best of our daylight, for it is quite dark until ten in the morning and after two in the afternoon. Twilight does not make any supply of the absent sun. Danenhower started a school of elementary navigation for the crew.

December 6th, Saturday. — A cold spell has arrived, but as the wonderful auroral display was on the 2d, I fear it is stretching it too much to make a connection with the cold weather. The highest temperature to-day is minus 11°, and the lowest minus 24° (at end of day with N. W. wind). Its effect on the ship was to

keep up a cracking at night up to midnight, caused by the contraction of the metal fastenings and consequent snapping of the wood. We have noticed heretofore considerable hair sticking to the ice, where the dogs in lying down had frozen fast, and had to tear themselves away; but this afternoon a dog stuck so fast that he had actually to be dug out with a shovel. Pretty cold weather!

December 7th, Sunday. — The cold spell continues, the highest temperature being minus 21° ; the lowest minus 25° . Inspected the ship at eleven A. M. To my unpleasant surprise I found considerable dampness on the berth deck at the forward and after ends over the berths. The stove, being about amidship, was sufficient to keep the central portion of the deck dry. The forward end communicated with the outer air by means of the skylight leading to the spar deck; which, though covered by the tent awning, received air through a hole in the said awning. The after end communicating by doors, having holes in the lower panels, with the galley room, receives its air from the deck-house, which is kept at an average temperature of 45° , and hence ought not to be as damp as the forward end. In reality, however, it is about the same. Hence I conclude that the condensed moisture is due to the skylight being opened for the forward end, and the same for the after end, with the addition of the spar deck (forward of the deck-house), from its coldness caused by contact with the outer air, serving to condense the warm air below. We have a skylight cover made of galvanized iron, with a funnel, and we will now keep that in place steadily, to see if the moisture will collect in that and freeze, as was the experience of Sir John Ross. In addition we shall also cover the under side of the spar deck with

felt or canvas, or carpet over these forward and after berths and watch the effect.

We are beginning to appreciate other discomforts. Our distilling with the Baxter boiler is not successful, the resulting water being too salt for healthful use. The salt is due to two causes: first, the boiler receives its water from a tank which is filled from the top of the deck-house by drawing water in a bucket from a hole cut in the ice alongside the ship. If greatest care be not exercised (and what sailor will exercise it with the thermometer 25° below zero?) water is slopped over the distilling coil, also on top of the house, and trickles down into the water barrel. A very little salt-water trickling down spoils a half day's distilling, and as we are able to distill only enough to meet our daily wants (say forty gallons), it is a serious matter. It has taken us some days to discover that trouble, and now we will remedy it by rigging a pan to catch drip. Second, the boiler is so shallow that when the pump is started to feed it, if the pump by accident be started quickly, the pressure in the steam space is so suddenly relieved that the water bubbles up and goes over salt to the water barrel through the coil. The same effect is caused by admitting too much steam into the coil; and if we do not admit enough, the coil freezes up and bursts, as it has done several times. If we bring the coil down inside the deck-house, the temperature will not be low enough to condense enough steam for our daily use, and there we are. We have almost scraped the floes bare to get snow enough to melt for washing purposes. The resulting water is very salt, and it was the use of that water which brought on diarrhœa. However, Melville has set to work to improve the distiller, and he rarely misses a complete success.

We also begin to feel the darkness. Four hours' daylight is not much. We have not even the moon now to bear us company. We do not suffer of course, and I notice no diminution of appetite. Everybody rallies around the table at meal times, and is as cheerful as usual. But it is unnatural for us to have this enforced close companionship, and we seem to get in each other's way. We are warm and comfortable, but we would like to be able to go "somewheres." We cannot go out and walk in the dark with any object except exercise, and our two hours' walking match from eleven to one seems to supply enough of that. We read and smoke, and growl at the stove when it does not throw out enough heat, or at the cabin door when it lets in too much cold. The uncertainty of our remaining quiet in the ice for an hour at a time prevents the erection of our observatory, and the taking of interesting astronomical and magnetic observations. We are able to make our hourly meteorological observations only. Our suspicions of the moving of the ice seem to have communicated themselves to the dogs, who come on board regularly to sleep; in fact some of them march up the gang-plank as methodically as we do when it strikes two bells. A few of them, however, remain on the ice to make us chase them, when the ice breaks up, and we are on the anxious seat.

We have had no bear excitements for some time. Fox tracks are plentiful, but no foxes have as yet been seen. Occasionally our hunters report having seen blood where a bear has caught a seal and eaten him; and bear tracks are followed up until daylight fails, and the chase must end. From ten P. M. to midnight we had a beautiful auroral display in the form of loops.

December 8th, Monday. — I am afraid we are on the

verge of another ice disturbance, for at times during the day the ice to the N. E. of us, and distant half a mile, began to move with its usual accompaniment of groans and shrieks while under pressure.

December 9th, Tuesday. — A south southeast gale all day. No movement to the ice.

There is a wonderful sameness to our daily life, and I can as yet devise no efficient way of changing the monotony. We are continually standing by for a movement to the ice with everything ready for an emergency. Knapsacks at hand, sledges packed, boats ready, medicines and instruments, arms and ammunition, sledge parties all told off; all these things keep us in a position of unrest and uncertainty. We seem to feel as if we were living on the edge of a crater. Under the circumstances we can do nothing but wait, thankful each morning that we are no worse off than we were the night before, and yet anxious as to what the day may bring forth. Were we in a harbor and could consider the ship a fixture until spring, we should hardly feel the winter in the many occupations and amusements we should have, but here adrift in the pack we can only wait and watch.

The necessary and inevitable refuse of the ship has rendered our surroundings not at all pleasant to contemplate. If we could only have snow, this might be covered and kept out of sight, but I begin to believe snow never falls here. Although I ought to be glad that it is all outside of the ship instead of inside, I cannot help complaining of the lack of cleanliness of our surroundings.

Melville has made a complete success of the distiller, and now we get our water pure. But it takes two pounds of coal for every gallon of water, and that ex-

penditure will ruin us if we have to keep it up. Snow, snow is what we want.

The sheet-iron cover to the forward skylight, though acting as a partial condenser for the berth deck, does not keep it dry, and we shall have to resort to extra felting.

December 10th, Wednesday. — A very curious addition was made to-day to our naturalist's collection in the shape of the skull (?) and bones of codfish. These bones were picked up by the cabin steward in his walk to-day, between eleven and one, out of a large heap of similar bones, a couple of miles from the ship. They are probably the relics of some successful fishing on the part of a bear or of a fox. Experimented to-day with Snellen's types, to get an idea of the diminution of light. At noon the type marked D = 9, which, under ordinary circumstances, should have been seen at thirty feet, was readable at but twenty feet. Approximately, therefore, we have twenty thirtieths or two thirds of full daylight at noon.

I had placed to-day a series of thermometers in different parts of the ship, and commenced keeping a record of the temperatures; showing the temperatures of the living quarters, of the reservoirs from which air is received in them, and of the open air. For instance, the temperature of the berth deck at ten P. M. was 68°, the old galley-room 45°, the deck-house 49°, the cabin porch 14°, the cabin 51°, the open air 7°.

December 11th, Thursday. — The situation this morning seemed to promise a repetition of our exciting times. Daylight showed a crack in the ice ahead of and nearly alongside the ship, extending from S. W. to N. E. The opening was made so quietly that the watch did not hear any movement beyond a light

shock at 8.40. At ten A. M. there it was however, and by eleven it had opened out to a width of six feet, affording us an opportunity of measuring the growth of the ice since November 25th, the time at which we were squeezed out into what was then open water. By actual measurement to-day we find the thickness of the ice to be twenty inches, and that is direct freezing. For some reason the ice immediately surrounding the ship was not broken adrift, nor even badly cracked on the starboard side of us (ship heading S. S. W. true). At eleven movement commenced. The floe in which the ship lay moved to the northward—where it was broken on its edges by coming in contact with heavier floes, and remained comparatively motionless, after shortening our two hundred and forty yard walk by some forty yards. The ice on our port hand then got under way and moved along slowly, like a panorama, until it had proceeded about two hundred yards to N. E., and then it stopped; the opening six feet wide began to close, and in a few hours everything was quiet again, except an occasional suppressed shriek indicating pressure. The ship was not affected in the slightest degree. While looking around for a cause for this movement we observed the clouds moving rapidly from the S. W., preceded by a scud, indicating clearly a S. W. gale. The barometer had fallen to 29.50, and up to eleven A. M. we had been having six and eight mile winds from the S. S. E. and S. At eleven the wind jumped suddenly to S. W., and commenced to pipe up. Beginning with eight miles, it reached by eight P. M. a velocity of 25.5 miles, blowing at times in heavy squalls at the rate of, at least, forty miles per hour. At midnight it went to W., and was blowing twenty-one miles an hour. The barometer rose with

the change of wind to S. W., and at midnight read 29.80. The temperature, which had gone up to plus 16°, fell rapidly 9° in one hour, and at midnight was minus 8°.

At eleven P. M. we had a very fine auroral display. A wave of light crossed the zenith from the E. to the W. horizon which pulsed regularly in its transit, waving about, however, in its pulsations, like a long streamer of bunting let go in a fresh wind. It is very difficult to give a satisfactory description of these things, and impossible to make a fair picture of them, for no picture can show pulsations of waving light. It requires actual sight to realize their appearance. I have not been able thus far to connect their appearance or non-appearance with any meteorological phenomenon, or with any other unusual occurrence.

December 13th, Saturday. — We have been trying regularly to get sights to determine our position, but are prevented by the almost perpetual haze that intervenes, making a reflection in the mercury of the artificial horizon impossible. In the absence of the moon we have to fall back upon Sumners by stars. Latitude by Polaris is out of our reach on account of its great altitude and the impossibility of getting it with sextant and artificial horizon.

December 14th, Sunday. — A variety of winds and weather to-day. At eleven A. M. made the usual Sunday inspection. Every part of the ship was in as good order and condition as can be expected where our cleaning is limited to scraping and an occasional wiping up with cloths and warm water. As to dampness there is cause for complaint. The cabin and ward-room are dry and comfortable, the deck-house is damp, and in places wet from the tracking in of slush and dirt from

the ice and its melting by the heat of the Baxter boiler, and also from the moisture created while the distilling is going on, and the berth deck is damp to a slight degree on the beams and ship's side in the wake of the forward and after berths, as described in my remarks of last Sunday. Felt and canvas have been used freely during the week to try to stop this dampness, but it still exists, and I do not think any means would be effectual short of building a house over all the deck, chock forward to the bows. To be sure we are troubled with dampness to the same extent as previous expeditions, but then we have not had as yet such extremely low temperatures. We are able to keep all the slop of washing clothes and persons clear of the living deck by having all that done in the deck-house; and as the men do not enter the berth deck directly from the open air, we have no cold air rushing in and being spread around. As all work is done in this deck-house, and the men's fur clothing and knapsacks are kept there, there is no room occupied on the berth deck save for eating and sleeping purposes; and as the carbonic acid estimates are not now extremely bad, we can put down the slight drip as the only objectionable feature as yet to our winter experience, so far as general health and comfort are concerned.

If life within the Arctic circle were perfect comfort, everybody would be coming here. We must be thankful that our discomforts are no greater. Everybody is in good health and in good spirits. There are individual cases of feeling the time hang heavily, and of being mentally "out of sorts;" but this arises, I fancy, from the non-realization of an impossible scheme of Arctic cruising and life rather than from any effect on the general health. Excepting Mr. Dunbar and Ninde-

mann no one has passed a winter in the Arctic before. Mr. Dunbar's experience has been limited to a winter in Cumberland Gulf, where his ship was in a snug harbor, and communication could be had and was had with the natives. Nindemann's experience covers one winter in the Polaris in Thank God Harbor, and his terrible winter-drift on the ice-floe and miraculous rescue. For the rest of us it is our first experience; and when we add to our wintering in the pack, with all its uncertainties and terrors, the knowledge that we attained no high latitude our first season, made no discoveries, so far as we know have made no useful additions to scientific knowledge, we cannot help feeling that we are doing nothing toward the object of the expedition, and are consuming provisions, wearing out clothing, and burning coal to no purpose. However we cannot tell what may be in store for us, and in our ignorance it is better to hope for good results than to pass our lives in fearing bad ones.

New ice has formed twenty inches in thickness around us, and salt has been deposited on its surface by crystallization. What the certain thickness may be at which the ice is almost free from salt I know not, and Weyprecht does not say. But with a saw we cut from a thickness of sixteen inches of ice four pieces, each four inches thick, in regular succession, melted the ice, and the resulting water was so salt as to be unfit for use. I will try this experiment with an eight foot floe in a few days, and inscribe the result in this record. Without evaporating the water, and weighing the remaining salt, I could not say what the exact degrees of difference were, if any, between the several four inch layers; but by the nitrate of silver test the water turned white in each case to the same degree,

and the bottom layer made water as unfit to drink as did the surface layer containing the crystallized salt.

December 15th, Monday. — An uneventful day. The Snellen type test seems not a good way to obtain even a comparative record of the intensity of our daylight; for whereas we could read a certain kind of type at a distance of twenty feet on the 10th inst., we can to-day read the same type twenty-seven feet, and yet the circumstances of sky and weather seem exactly the same.

December 16th, Tuesday. — As far as it is possible to do so, we are beginning to have some confidence in the stability of our position. We have had such a quiet time with the ice lately that we feel quite confident and reassured. So much so that we contemplate neither a breaking up of the ice nor any treachery while we are walking over it. As if to show us, however, how particularly deceitful our surroundings are, Collins and two men broke through the ice to-day at different times and places within a radius of three hundred yards from the ship. No harm resulted beyond a ducking, from thus involuntarily taking the temperature of the surface water. Highest temperature, minus 11°, lowest minus 26° (our lowest thus far).

December 18th, Thursday. — This morning we discover a large opening in the ice about five hundred yards to the northward of the ship, about one quarter of a mile in width and extending east and west. This is bringing the uneasiness close home.

At five p. m., by a meridian altitude of the moon and an altitude of Mars, Danenhower establishes our position in lat. 72° 27' N., long. 178° 23' W., showing a drift of eight miles to the W. 21° S. since December 2d. We seem to be, therefore, in a comparatively quiet part of the ocean.

December 20th, Saturday. — Measured the thickness of the ice again to-day. The growth of the new formation, from November 25th to December 11th, was twenty inches; to-day the same ice measured in the fire-hole is thirty inches, showing an increase of ten inches in ten days.

This afternoon we had a slight crashing and moving of ice to the northward of us, but it did not last very long and gave us no concern.

Nindemann brought in a seal to add to our delicacies.

December 21st, Sunday. — A blowy day.

December 22d, Monday. — The shortest day in the year. Although we cannot say, "Now is the winter of our discontent made glorious summer," we can say that our Arctic night is half gone, and that we shall now have an increasing light to contemplate instead of a failing one. The earliest sign of a gleam of daylight was at 8.40 A. M., but of course it was nothing to speak of. At 9.15 one could be sure that there was a sun somewhere; at twelve that we had daylight to, and 60° beyond, the zenith to the northward; at one that day was fading; at three it had faded, while at 3.40 not a speck of twilight was left to us. At noon Snellen's types, which are ordinarily read at thirty feet distance, were distinguishable at twenty-three feet; perfectly favorable conditions of atmosphere, the types held towards the south. Though this is but an approximation toward measuring the amount of twilight, I know of no better. As we had the bright light of a moon nine days old, and 18° in N. declination, our light was mixed even as late as an hour before and as early as an hour after noon. But that the daylight was stronger than the moonlight was proven by the fact that, in walking, our shadows were thrown from the

daylight and not from the moonlight. Well, here we are in the pack. So far, with two exceptions, we are in good health. The two exceptions are Mr. Danenhower and Mr. Dunbar. Mr. Danenhower has an inflammatory trouble with his left eye, which obliges him to keep it blinded, but is of no very serious character. Mr. Dunbar has caught a bad cold which has run him down considerably, and as he says he never was sick before it seems to depress his spirits to be ailing now. Some of us are troubled with extreme sleeplessness, myself, probably, worst of all, or, at least, as badly. My work not being over until one A. M., at which time I retire, I rarely get asleep before 3.30, and sometimes not until four A. M. I avoid napping as a rule during the day, but it seems to make no difference. The lack of sufficient exercise may be the cause of our wakefulness. As an electrical celebration of the shortest day in the year, we had a display of auroras far exceeding in quantity, and, perhaps, also in quality any previous efforts in that line.

December 23d, Tuesday. — The high winds of the last few days having accumulated some snow near us we set to work to-day banking it up against the ship's side, with the hope of adding to her warmth and diminishing the dampness of the berth deck.

December 24th, Wednesday. — A day of high winds, cloudy and unpleasant weather, and occasional flurries of very fine snow.

Christmas Eve. Our surroundings are not of the most cheerful character, and our ship is not large enough to make any effort at theatricals possible. A feeble attempt at minstrels was in contemplation during the past week, but it has not yet matured. In order that some little conviviality and good feeling might be

occasioned or encouraged, I served out three quarts of whiskey among the men in the evening, which seemed acceptable, and Melville mixed a fine compound from Irish whiskey presented by Paymaster Cochran before we left, and with one exception we joined aft in drinking to a merry Christmas to absent ones and to the health of Cochran. Danenhower proposed and we drank to the health and success of "our old shipmates" (Mrs. De Long and Sylvie), and so in the interchange of yarns and recollections we welcomed in the Christmas Day with the hope that at its next coming we should be at least no worse off.

Christmas, December 25th, Thursday. — A cloudy, dark, and disagreeable day, with high winds and light snow. The winds veer and haul between E. N. E. and S. E., with velocities ranging from eighteen to twenty-six miles an hour, temperature rises from minus 2° to plus 7°, soundings at noon in thirty-one fathoms, indicate drift to W. S. W. While the winds were blowing at midnight from S. E., the clouds, cirro-cumulus, were driving across the moon's face from the S. W. The same occurrence was noticed by me last night and the night before.

Christmas Day! This is the dreariest day I have ever experienced in my life, and it is certainly passed in the dreariest part of the world. And yet we (or rather I) ought not to complain, for it is something to have had no serious mishap up to this time. We tried to be jolly, but did not make any grand success of it until dinner time, when fore and aft we had such a grand banquet that we were for a time lifted out of and beyond the contemplation of our surroundings. We should have been comparatively happy were it not that one of our mess did not appear at the dinner table. At four P. M.

the crew, headed by Boatswain Cole, came aft into the cabin to wish us all a merry Christmas, and to invite us into the deck-house to hear a little music. We thanked them for their courtesy and went to the deck-house, where they played music, sang songs, and Alexey gave us a native dance. At all events the crew seemed to have a merry Christmas.

December 26th, Friday. — At 10.15 p. m. a sharp crack was heard on our starboard side, and on going on deck to look for a cause open water was discerned ahead and on our port side to the eastward about three hundred yards distant. I went out to it and found that



A Peculiar Ice Form.

the ice had opened into a channel about twelve feet wide, extending for about a mile north and south, and curving around our bow to some new ice made over an opening of yesterday. I must now believe that this ocean is subject to tidal action, for as all our pressures have been at or about the times of full and new moon (full moon, October 29th; new, November 13th; full, November 28th; new, December 12th; full, December 28th), they can be traced to the greater movement due to the spring tides, as suggested by Chipp, on October 31st.

December 27th, Saturday. — At five A. M., a light halo with prismatic colors; at six, a lunar circle; at seven, a faint aurora to N. E.; at eight, a halo. At 11.30 A. M. there was a slight movement to the ice beyond and along the opening of yesterday.

December 28th, Sunday. — From 5.10 to 5.25 A. M. there was a slight eclipse of a portion of the moon's lower limb. If we had been able to have our observatory in working order on shore we might have made exact observations of this occurrence. But as we are in our uncertain state in the ice-pack, we can do no more than note the fact of an eclipse having taken place. At one P. M., held divine service, only four beside myself attending.

In the afternoon one of our dogs began to act queerly, seemingly bereft of all power of motion. Supposing that he might by some chance have become frozen we had him carried on board and laid on felt in the deck-house. He still declined to make any exertion, and his jaws were locked together, while his eyes were fixed and expressionless. In the evening the doctor injected ammonia into him with small effect.

December 29th, Monday. — A slight grinding movement in the neighborhood of the late opening of the ice to the eastward at 10.10 P. M. At noon there was something appearing very much like land between S. by W. and a half W. and S. W. and a half W. We believed that we saw an increase in the amount of daylight already at noon. To-day the sky had quite a rosy tinge at the southern horizon, and the light was almost sufficient to have an effect on the sky to the northern horizon. A full moon, nearly on the horizon, at its northern culmination, made it impossible to say where the daylight ended and the moonlight began.

The dog mentioned as being sick died during the night, and we have now but thirty-eight left, and one of these is dying slowly, too, having been bitten through the nose in a fight at St. Michael's. Alexey opened the dead dog, and found in his stomach a wad of oakum as big as my fist, which of course caused his death. These dogs will eat anything, and in spite of all attempts to prevent them. They are given a dried fish each daily, but all the same are prowling around day and night among empty meat cans and ash heaps, and making a rush every time a pan of dish water even is thrown over the side.

December 31st, Wednesday. — The last day of the year is, so far as weather is concerned, dull and gloomy. The earliest trace of dawn occurred at 8.16 A. M. Occasional flurries of snow, very fine and driving, seem to promise us some relief from our expenditure of fuel in distilling, but as soon as we begin to think it really will snow, the snow flurries cease.

Danenhower was placed on the sick list to-day, his eye having regularly broken down.

To give an impetus to the social feeling in seeing the old year out and the new year in, I sent four quarts of brandy forward for the crew, while Melville heated the water for a savory compound aft, and as midnight approached our little colony of thirty-three people waited for the sound of the ship's bell to say good-by to the year 1879, and welcome to the year 1880.

1880, *January 1st, Thursday.* — The birth of the new year was announced by the rapid ringing of the ship's bell by the man on watch, and the crew, all assembled on the quarter deck, gave three cheers for the "Jeanette," and sent a deputation of two men into the cabin to wish us all a happy New Year. The year opened

clear and pleasant. The temperature began at minus 24° , but at four A. M. it dropped suddenly to minus 30° , and by eleven A. M. it had reached minus 39° , running along at that steadily until midnight, when it reached minus 39.5° . The temperature was probably lower, but the mercurial thermometers began to freeze, and the spirit thermometers did not record accurately at this point.

At three A. M. we had a lunar circle showing faint mock moons, the lowest mock moon very bright. Through the real and two lateral mock moons a curved line passed toward the horizon. At nine P. M. a blood-red halo around the moon. Early daylight at 8.14 A. M. Sounded at noon in $30\frac{1}{2}$ fathoms. Owing to the low temperature and strong wind blowing, I suspended for the day the operation of my regulation making everybody leave the ship and exercise on the ice from eleven A. M. to one P. M.

At three P. M. everybody sat down to a capital dinner, and afterward we got ready for the minstrel performance in the evening. Our men had rallied from their failure to get up one for Christmas, and seemed determined to make this entertainment good enough for both occasions. During the day invitations were sent aft, accompanied by programmes. At 8.30 one of the men came to the cabin and invited us into the deck-house. Entering, we found a nice little stage erected with drop-curtain, footlights, etc., and tastily decorated with flags. The performance commenced with a minstrel variety, jokes and conundrums sandwiching in with the songs. One conundrum was excellent (pointing to one of the stanchions of the deck-house): "Why is that stanchion like Mr. James Gordon Bennett? Because it supports the house." Sweetman's songs were

very good, and Kuehne's violin solo was fine indeed, especially when one takes into consideration the fact that a seaman's life does not serve to render the fingers supple and delicate. Mr. Cole gave us a jig with all the gravity of a judge. One of the features of the evening was the reading of a prologue composed by Mr. Collins, in which each one of the crew was made the subject of a rhyme in turn. Alexey and Aneguin gave us native dances, and the latter an imitation of a song sung by our Chinamen. The Chinamen gave us their native song, and a sham fight with knives and a pole, winding up by imitating with much contempt Alexey's and Aneguin's manner of singing and dancing.

Instead of shadow pictures we had *tableaux vivants*, "Neptune" (Cole turning a wheel, our broken spare one, mounted on a camp stool); "Sailors mourning over a dead marine" (two sailors mute with grief over an empty brandy-bottle); "A glimpse at Vulcan" (our prize blacksmith, Dressler); "Queen Anne" (Aneguin — Anne Gwyne — Queen Anne); "Is that a bear I see?" (Alexey with dog, aiming at some unseen object); "Mars" (man on crutches); "Taking an observation" (man drinking out of uplifted bottle), were all capital. When, the performance over, we broke up at eleven o'clock, we all felt satisfied alike with the ship, the minstrels, ourselves, and the manner in which we had celebrated the first day of the year of our Lord 1880.

January 2d, Friday. — A startling meteorological fact can be recorded to-day. We have seen some pretty high barometric readings, but to-day's experience goes far beyond anything ever seen by our party. The pressure began at 30.64, but it rose to 30.85 at noon, and at midnight had reached 13.13. These readings

are reduced to a temperature of 32° Fahrenheit. The thermometer remained uniformly very low, the highest being minus 37°, and the lowest 39.5°.

There is, no doubt, a heavy blow going on to the southward of us. For us the accompaniments of this high barometer and low temperature were a westerly wind veering, going to N. and ending in perfect calm, and almost entirely cloudless sky (a few light streaks to southern horizon being the only clouds), and no unusual electric disturbance. In fact, the auroral displays were quite ordinary. A lunar halo was also observed at three A. M., but it had no especial features. At daylight numerous water clouds were observed around us, but they disappeared during the forenoon as the ice closed. At ten P. M. the ice commenced grinding near us in the S. W., the motion, judging by the sound, being transmitted along a line running to the northward. What I mean by that is, that when the ice moved first it was in the S. W.; then the next sound was from S. W. by W., while in the S. W. it was quiet; so on to W. and along, the sound retreating to the northward. No motion was communicated to the ship or to the ice surrounding her. The noise was exactly like the paddle-wheels of a steamer beating the water, sometimes at full speed, and sometimes at half speed—even as it may be heard on a still night on the North River at home.

Every once in a while during this cold snap, we are startled by a loud crack like a rifle shot, caused by the drawing of some fastening. That we have not had more of them may be due to the extra secure manner in which our ship is built; for Mr. Dunbar seems to have experienced much more of this kind of noise in wintering in a whaler in Cumberland Sound.

January 3d, Saturday. — Early daylight at eight A. M. At noon good clear daylight illuminating the floe, and showing everything about the ship distinctly. Anemometer read clearly without lantern for the first time in many days. The southern sky showed bright red. The loom of land was descried to the S. S. W. At one A. M. the ice was again in motion to southward.

January 4th, Sunday. — At 12.30 a very brilliant meteor shot in a curved line from S. to S. E. and exploded like a rocket, showing red, yellow, and blue colors. At eleven inspected the ship. The berth deck at the forward and after ends is again beaded with moisture. The experiment of laying old mattresses on deck on the fore-castle and covering them with snow worked to a charm for a day or two, the berth deck being dry and comfortable, but it has broken out again as bad as ever. The fore store-room is dry, and, as far as we can see, entirely free from frost; but this is explained by its being covered by the deck-house. The after store-room is full of frost, and will have to be thoroughly broken out in the spring. The ward-room is dry and free from frost except the side bulkheads of the forward rooms (Danenhower's and Collins'); the forward bulkheads being felted are quite free from frost. Several of the officers discovered during the week that their mattress covers (ticking) had commenced to mildew and rot, moisture having collected between their mattresses and the berth bottoms. This has been remedied by each one turning up his mattress to air in the morning upon getting up, and airing it on Saturdays when the fire is lighted in the ward-room to heat water for bathing purposes. The cabin is dry, warm, and comfortable. During our two hours' walking exercise on the floe from eleven A. M. to one P. M., it is opened and

ventilated the whole or part of the time, depending on the temperature, and though we sometimes find it cold upon our return on board, that drawback is more than compensated for by having had the air changed.

Our little mess is pulling through the winter fairly well. Mr. Dunbar is getting back to his usual good condition, but Mr. Danenhower is having a hard time with his eyes, the inflammation being so great that he cannot bear any light to fall upon them. The rest of us are up to our usual standard. At one P. M. read the Articles of War and mustered the crew. After which performed divine service.

January 5th, Monday. — This morning the doctor came to me and represented that Danenhower's case was of a very serious character, and that there was great danger of his losing the sight of his left eye. Owing to the necessity for shielding the eye from all light, it would become necessary for Mr. Danenhower to remain in his room in total darkness, and it was feared that this might affect his general health and depress his spirits. I am much distressed at the news, for Danenhower is highly prized by all of us, and by his efforts has kept us many an hour from moping. He is now shut out from all participation with what is going on, and we can do nothing but go down occasionally and sit with him in the dark and talk with him. He is cheerful enough himself, however, and, having great force of character, has made up his mind to accept the situation and fight it out patiently.

January 6th, Tuesday. — The surgeon handed me to-day his report of the result of the monthly examination. He considers the condition of the majority of the officers and men satisfactory. His opinion of Danenhower's case I recorded yesterday. Several of the

officers and men complain of sleeplessness, which I have also previously noted. Of the thirty-three officers, seamen, and natives, twenty-three are in excellent condition; eight are in good condition; one is in fairly good, and one in poor condition — so that I think we are in no very serious amount affected by the endurance of the Arctic winter.

January 8th, Thursday. — Danenhower's case still excites uneasiness in the surgeon's mind. The best that can be said of it is that it grows no worse. As it is already very bad, there is but little comfort in this knowledge. This continued confinement in a dark room may prey upon Danenhower's mind, although thus far he has borne it bravely.

January 12th, Monday. — At two A. M. a slight ice movement to westward. At 1.15 P. M. a sudden sharp crack made the ship jump one quarter of a point in azimuth. Supposing that we were in for a time, I ran out on deck, but found everything surrounding the ship in its usual quiet. About eight hundred yards to the southward, however, there was the sound of grinding and crushing, and this movement no doubt was the cause of our getting a sudden nip and consequent scare. Knowing that all our trouble came at new and full moon, and that we had a new moon yesterday, I stood by anxiously all the afternoon and evening for some further demonstrations, but nothing occurred, and we were able to go to bed in peace and quiet. From the sudden lowering of the temperature, I am inclined to think we are going to have another cold snap.

January 13th, Tuesday. — My expectations of a cold snap have been realized, — the thermometer, which began at minus 24°, having gone down steadily to minus 35° at nine P. M., and only risen to minus 32° at midnight.

This cold snap followed very closely the new moon, and I observed by looking back in the journal that our other cold spell occurred at about the same time after full moon, which I had been led to expect by the remarks of Dr. Kane, McClintock, and others. At the full moon instance our mercurial thermometer indicated minus 39.5° , which is 4.5° colder than our new moon experience. The weather to-day was remarkably clear and beautiful. From six P. M. to midnight the sky was absolutely cloudless, and the southern horizon seemed as clearly defined as a knife edge. The delicate new moon a little above it, the stars bright and cold, the absolute calm, made a picture such as one was forced to linger over in spite of danger of freezing nose and face. Turning about, an equally beautiful picture, but of a different kind, met the eye, — the ship. For the last two days there was considerable moisture in the air, which was deposited on our rigging in rime and light fluffy masses like down. Freezing there immediately, of course, every rope and spar seemed made twice its usual size; and this evening, after gazing at the perfect picture which nature gave us of a midwinter night, to turn around and look at the ship was to feel that she had dropped out of fairy-land in her pure whiteness, and was too — Well, I can't say what I want to. These outbursts are too much for me; I commence them, and cannot finish them; I seem to know the tune, but can never remember the words. Occasionally I go out on the ice on these beautiful evenings, and try to make words express my feelings suitably; but a lot of dogs wrangling over an empty meat-can, trying to find a meal in it, surround me, and drag me down to plain matter of fact. So I take my half-frozen nose tenderly in my hand, and lead myself back on board ship.

At 9.15 P. M. the quartermaster came in to report heavy grinding and movement ahead of the ship to the S. S. W. Seizing a lantern I rushed out upon the floe, accompanied by Alexey, and from the horrid din and screeching of the ice I thought the commotion could not be fifty feet from us. Alternate the howling of a gale around the rigging of a ship with the beat of the paddle-wheels of a hundred steamers, and you will have a good idea of what this noise sounded like. Not feeling any trembling to our floe, I concluded to look further for the disturbance, and so went on. After going about one thousand yards and crossing two cracks my



A Quarrel Over a Meat-Can.

lantern went out. We were not up to the disturbance yet, and the noise was quite as great. After floundering and stumbling around for a while, I decided to return and await events nearer home. Alexey and myself, after rolling over and over a dozen times or more in the darkness, made our way back, and finding no disturbance at the ship, we dismissed the subject contemptuously as "plenty noise, small move." At eleven the noise and movement had passed off to the eastward,

and were growing faint in the distance. The carpenters commenced to-day the building of two more sleds, to carry our cutters in case we have to abandon the ship, which God forbid.

January 14th, Wednesday. — Excepting a little additional movement in the distance to the S. W., the ice gave us no alarms. But at its best, it is so treacherous that we never feel safe. I went with a dog sled several miles around the floe and saw a few openings, already frozen over, but these are the only signs of recent movement. The big piles of slab ice heaped up here and there are the results of the great November confusion which broke us adrift and floated us to our present insecure berth.

January 15th, Thursday. — We have had considerable anxiety to-day on account of the ice. At noon a slight shock was experienced, and on going out on the floe I found that it had cracked and opened about twenty feet from our starboard side (ship heading S. S. W. and a half W.), the crack rounding the bow and going ahead in the prolongation of the stem in one direction, and in the other, passing along, it went across the stern at a distance of about one hundred yards. This crack widened, until at three it had become eight feet in width, and at the same time a fissure appeared on our port side about one hundred feet distant, which became an opening at six. As far as could be observed, the general direction of the ice movement was to the E. and S. We were not disturbed beyond an occasional snap, as some fracture took place in the ice, but this horrible uncertainty grows wearisome. Living over a powder manufactory may be exciting, but it is not healthy excitement; and our constant state of anxiety may well be compared to it. As the daylight left us,

at four, our position was within a small floe with water all around us. Of course, the ice will close up again, and then it is a question of strength. If the small floe is squeezed on two sides it will collapse, and then the ship gets the pressure; if squeezed on one side it will go to the main floe on the other, and the edges will break up and pile up until the broken masses reach the ship's side. In any case, the ship comes in for some unpleasantness, so there is not much choice. Ice forty inches thick is a powerful enemy but a weak defender.

January 16th, Friday. — Although the wind did not attain a high velocity, it seemed to be peculiarly searching and very loud. While we have been able to take our usual walking exercise with less wind and minus 29° temperature, to-day a temperature of minus 16° was unbearable. I accordingly dispensed with the enforced exercise, although I make it a general rule to keep it up as long as the thermometer stands above minus 30° .

At 12.30 A. M. the familiar grinding and groaning made itself heard on our starboard side. Examination showed that the floes which separated yesterday were coming together again, and breaking up the new ice which had already formed in the crack. Beyond an occasional jar and shock, the ship did not move. At three the ice again began its movement, and this continued at intervals all day until seven P. M. Jars and shocks were frequent, but the ship did not move, keeping the same heel $2\frac{1}{2}^{\circ}$ to starboard, although she was receiving considerable pressure on her underwater body. We had, therefore, nothing to worry us but a constant state of tension and anxiety. The auroral display was extraordinary.

January 17th, Saturday. — The day opened pleasant and clear with a N. W. wind. The barometer rose stead-

ily from 29.62 to 30. The temperature ran down rapidly, giving us our coldest experience thus far,—beginning at minus 21.5°, it ran steadily down to minus 42° by five P. M., at which temperature our mercurial thermometer, No. 4,313, froze solid, and declined to go down any further. Mercurial thermometer No. 4,274 kept on, however, and accommodated us at midnight with a reading of minus 44.5°. The two spirit thermometers were slow to realize how cold it was, for No. 4,402 had got only to minus 42° at midnight, and 4,397 to minus 41°; but they may do better hereafter. The weather has been beautiful all day, scarcely a cloud and but little haze preventing the sky from being perfectly clear. Excepting a slight movement ahead of the ship at seven A. M. the ice let us alone, giving us calm minds to enjoy the cold and the auroral display. Early daylight at 6.55 A. M. As we have had so much clear weather we have seen nothing of the land to the southward. The refraction has caused it at other times to be lifted so much above the horizon that we have been quite misled as to its distance. By our last determination of our position, we are one hundred miles to the northward and eastward of Wrangel Land, supposing its position to be correctly defined on the chart, and yet when we last saw it it was hard to believe it more than fifty miles away.

A careful measurement of a portion of the turned up floe broken off in the late squeeze gave us a thickness of forty-six inches, the result of direct freezing since November 28th.

January 18th, Sunday.— I inspected the ship at eleven A. M., and found the berth deck fairly dry. By watching the moisture carefully, and wiping it off whenever it appears, the berths are kept dry; and by airing

the mattresses weekly in the deck-house, and turning them up from day to day in the berths, I think we avoid any evil consequences which might be produced by damp bedding. At one P. M. I read divine service in the cabin.

January 19th, Monday. — A day of great anxiety and trouble. At 1.30 A. M. there was a loud noise as of the cracking of the ship's frame from some great pressure. I was sitting in my room at the time, and the sound seemed to come right abreast of me. I subsequently learned that a similar sound had been heard on the berth deck about abreast of the foremast. I ran out to look for a cause for this noise, but could see nothing. The ice was perfectly quiet, and no evidence of anything wrong could be found about the ship. After waiting an hour for further developments, nothing occurring, I turned in, supposing it might have been a bolt drawing by reason of the extreme cold. At 7.45 the wind suddenly shifted from N. to W. N. W., the ice began to move, and, amid the groaning and grinding of the floes, the ship was felt to receive tremendous pressure. The line of ice movement appeared to be at the break across the bows which occurred December 11th and closed up the same day. But the ice, while moving along slightly to the eastward, came down toward the stem, broke off large pieces of floe at the old fracture, and, piling up these masses under the stem, brought a tremendous longitudinal pressure on the ship. The ship being firmly imbedded in the floe, and held firmly on all sides, could not, of course, go astern, nor could she rise, although her curving bow was in her favor, and in consequence it became a question of her fore and aft strength. As she had stood an equally severe pressure on her sides (much weaker places, of course), I had

no particular fear; and when I saw the floe on her port side buckle up and break in long thwartship cracks, and then the movement and pressure both seem to cease, I believed that we had weathered one more nip.

At 10.30 A. M. when the men went down in the fire-room at the daily serving out of coal, Sharvell heard the running of water in the bilges, and promptly reported it. An examination was made at once, and we discovered that water was flowing from forward. Following it up we found to our dismay that there were two streams of water an inch in diameter, flowing through the filling which had been put in below the berth deck at the Mare Island Yard; and that the water stood at a depth of eighteen inches in the fore-peak, at twenty-four inches in the store-room, next abaft it, and thirty-six inches in the fore hold, while in the fire-room it was over the floor-plates on the star-board side. The deck-pumps were at once rigged and manned, and I ordered steam to be raised on the port boiler to run the steam-pump. While one watch worked the pumps, the other watch were put at work breaking out the fore peak, hoisting the flour out of the store-room next abaft it, and breaking out the fore hold. To my great relief the pumps seemed to hold their own. The forward bilge-pump (the only one worked) being in the deck-house, the men were sheltered from the intense cold, and were able to work to advantage. We had great difficulty in getting the use of the steam-pump. In the first place, the sea cocks being frozen we could not run up the boiler from the sea, and hence had to resort to pouring water from buckets through the man-hole plates. The temperature of the fire-room was then minus 29°, and we were a long time in getting the pump in a condition fit for use. But by Melville's

indomitable energy it was ready by three P. M. Up to this time we had carefully kept the gates of the forward water-tight bulkhead closed to keep the water in one compartment, but when steam was ready we opened them. The water did not flow aft readily, however, the limber holes under the coal bunkers being frozen or otherwise choked up. Such water as did come aft was pumped out by steam through the fire hose connection on deck, and by hose through a scupper; our steam-pump suction was on the port side, and the ship being heeled $2\frac{1}{2}^{\circ}$ to starboard, the greatest amount of water came aft on the starboard side. Hence the steam-pump could work only when the water rose above the keelson, and washed over to port. I kept all hands on deck until midnight, and then sent one watch below; and, in view of the hard work everybody had been called on to perform, I served out two ounces of brandy to each man. Nindemann stood down in the fore peak up to his knees in water, stuffing in oakum and tallow into every place from which water came. As fast as he stuffed it in below the water came out above; and when finally he got so far that but a little water trickled out from the bow-filling, it forced its way out through the ceiling. We put Alexey and Aneguin to work digging out the ice under the bow, to try to find out where the injury was and of what nature. But after they had dug away some of the pieces which had been piled up, the water flowed over the ice beneath and froze, and effectually stopped work. No sign of injury could be seen outside, and nothing inside but the flowing of the water, and, as far as may be judged from appearances, it would seem that the ship's forefoot has been broken off or twisted, starting the garboard strakes. Until we can free the ship from water we can

do nothing towards building a water-tight bulkhead across the fore peak, and thus keeping the water leak under control of the hand-pumps. As the water will not come aft readily to the steam-pump, we must get a steam-pump forward to it, for men cannot stand pumping from now till spring. Fortunately we have a pump in the engine-room which we can move forward to the old galley-room and connect by a long series of pipes to the main boiler, and that is suggested by Melville and commenced to be put into execution at midnight.

Everything was carried on regularly, quietly, and systematically. There was no excitement and no confusion. If we had to leave the ship, our sledges were ready on the poop packed with forty days' provisions, our boats were ready to lower, and we had the two dingys mounted on their sleds. Everybody had his knapsack and sleeping-bag ready, and our records and papers were in condition to seal up in a box, but thank God we had no occasion to experience that emergency. Temperature slowly rises to minus 44°. Early daylight at 6.50. Clear and pleasant. Bright moonlight and starlight. Considerable ice movement during day, and continuous heavy pressure.

January 20th, Tuesday.—A very disagreeable feature in connection with our trouble is, that we have a sick man on our hands (Danenhower), and his being unable to help himself, in case of an extraordinary emergency, makes it a cause of serious anxiety to me. The doctor was suddenly taken ill last night with a bilious attack, and for a time I was quite alarmed about him. But this morning he seems to be on the mend. Mr. Dunbar is not strong yet, his recent sickness seeming to have added twenty years to his age.

While we are in this uncertain state, there is not

much rest for Chipp, Melville, or myself; and among the men, Nindemann, Cole, and Sweetman seem to be as unwilling to take rest as ourselves. The last named is not very strong, and I fear would not stand a heavy strain. But Nindemann seems to know no such thing as fatigue. We do not gain much on the water, but then the water does not gain on us. The auxiliary steam-pump has been moved from the engine-room to the old galley-room, and secured in place against the berth deck bulkhead. Several repairs were made to it, such as fitting new valves, etc., but we had not finished running the line of piping to it from the main boiler by the time the day closed. A connection will be had with the main boiler through the steam-whistle pipe. As soon as we got the auxiliary pump in place we attempted to run it by the Baxter boiler, but the pump was too much for it, taking away all its steam almost immediately. The forward bilge-pump is worked by the watch, and at times we get the water down so low that ten minutes' pumping and ten minutes' spell keep the water in check. The flow of water aft to the engine-room is freer, enabling the steam-pump to be run fifteen minutes in every half hour, giving a breathing spell to the men. The boiler-pump exhausts into the bilge, and the feed water is taken from the bilge, all the sea cocks being frozen fast in their seats.

We cannot expect to free the ship by the hand-pumps alone, and are waiting for the aid of the auxiliary steam-pump. It may seem strange that so long a time is required to get this in operation, but our difficulties are enormous. To take a steam-pump down, move it, and put it together is a long job alone, without speaking of running steam-piping, all of which has to be fitted. Every man has been worked up to the top

notch of his strength, whether in engine work, at the pumps, or carrying provisions aft; and though there seems but little described on this page, the day has been spent in harder work than falls to the lot of most men. Still everything is done quietly and with precision, and aided by Chipp and Melville, whose superiors the navy cannot show, with their untiring energy, splendid judgment, and fertility of device, I am confident of being able to do all that man can do to carry on the expedition to a safe termination.

Considerable ice movement and pressure during the day. The ship has increased her heel to three degrees to starboard, and floe and ship have swung to south by west one and one fourth points. Light breezes between S. and W. all day, and temperature struggling up from minus 44° to minus 37°. The movement of the ice seems to be to the eastward. There are numerous ridges in sight where the floes have been broken and piled up upon coming in contact. The floe around the ship remains as yesterday, but when pressed yields in heavy surges which cause the ship to snap and crack. A careful examination shows no sign of anything being strained or broken inside below, in spite of the pressure; and from watching the incoming of the water we are still of the opinion that the injury to the ship consists of the breaking of the forefoot and the starting of the garboard strakes.

January 21st, Wednesday. — The work of running the line of steam-piping to the auxiliary steam-pump in the galley-room was completed by one A. M. The steam-pipe was, as I have before said, led to the steam-whistle pipe, which of course communicated with the main boiler. Upon turning on the steam the pipe was found to be frozen, and steam would not pass. We

had, therefore, to take down the pipe and thaw it out. This done, we tried again and got the pump to work, but found the suction pipe too small. We then removed the bilge suction pipe from the main engine and attached it to the auxiliary pump, and then the pump worked all right to my great satisfaction, for I was able to give our tired men a rest.

It was seven A. M. when we got the auxiliary pump running, but we immediately succeeded in keeping the water in check. By four P. M. we had got so much ahead of the water that the fore peak was dry enough to commence building a small bulkhead abaft of the bow-filling to stop the leak there to some extent. The water seemed to flow aft to the engine-pump more readily to-day, and by pumping fifteen minutes in every half hour in the engine-room, they kept that part of the ship free. Occasionally we would even get the auxiliary pump to suck, and we then drove plugs in the holes which we had bored in the forward bulkhead of the fore hold, and thus blocked up water enough to keep the auxiliary going all the time. This gave a spell to the men in the engine-room, and Melville (who will not sleep or rest) set them to work to make the necessary forgings for his proposed connection of the Baxter boiler to the forward spar deck bilge-pump.

There was considerable ice movement during the day, and tremendous pressure. The ship received many severe shocks, but these did not seem to increase the leak. I am rather inclined to think that a broken piece of floe has been shoved under her, and that she has been lifted above some of the pressure. She has risen two inches above her old line of flotation, which we have determined by marks made where her snow embankment came originally. The ship heels 3° to star-

board. I am a little afraid that there may be some accident to the stern-post and rudder-post from this excessive longitudinal pressure, although the fullness of the ship's counters may receive and take up a great deal of the strain.

Much hard work falls upon two men, Nindemann and Sweetman. These two have to take turns about in standing in the water in the fore peak, building the bulkhead across it. Nindemann seems strong enough for everything, but this kind of work tells on Sweetman, and I have once or twice feared that he would break down. Whiskey is served out to them once every four hours, and a generous supply of food and coffee is made for such other men as have night work, and I thus try to keep everybody up to his strength. Chipp and myself take twelve hours' watch, each, looking out generally for work, and watching the ice carefully for emergencies. This is like living over a powder magazine with a train laid ready for firing. Melville, when he does go below, instead of sleeping, lies awake planning some new means of pumping a ship by steam, which will be more economical than the main boilers. Danenhower is, of course, out of the case altogether.

January 22d, Thursday. — As the water was becoming low enough in the fore peak to work to advantage, commenced cutting and fitting planking for the erection of water-tight bulkhead across the fore peak twenty inches forward of the foremost side of the foremast, at the step. We also cut holes in the ceiling above the berth deck on each side, and shoved down between the frames as much ashes and picked felt as the spaces would hold. These things filled up all spaces down to the filling between the cant frames, say two

feet from the keelson, and towards the close of the day they seemed to have the effect of diminishing the leak. We had to keep the auxiliary steam-pump, in the old galley-room, going all the time, however, and in the afternoon discovered a crack in its suction pipe. Repaired it, and at the same time Melville added two lengths to it, so as to make the end piece lie horizontally in the bilge. This seemed to add to the efficiency of the pump, and we materially reduced the water. The limber holes under the coal bunkers seemed to have become more thawed or otherwise cleared, for the accumulated water flowed aft more freely, and was pumped out by the engine-room pump running one half the time. After noon only water enough came aft to engine-room to feed the boiler. The engineer's force are having plenty of work; for in addition to tending the boiler and steam-pumps, Melville keeps them at work making forgings and other fittings for our proposed connection of the Baxter boiler to the deck bilge-pump. Edison's electro-dynamic machine comes in handy, for we have taken its shaft to fit as a counter-shaft for the pumping.

Upon digging out the fire-hole to-day, preparatory to recommencing soundings, we struck hard, solid ice at a depth of four feet, which so completely closed the fire-hole from below that we could not get a lead down. I believe now that when we sustained the severe longitudinal pressure the advancing floe slid under the floe in which the ship is imbedded (for she lifted forward two inches), and now lies under her as far aft as her mainmast. No doubt it was this advancing floe which broke the forefoot.

The depth of water in the ship to-day is as follows: —

	8 A. M.	4 P. M.	Midnight.
At step of foremast . . .	22 in.	18½ in.	19 in.
At auxiliary pump suction, just forward chain lockers	24 in.	21¼ in.	19 in.
At after bulkhead fore hold	26 in.	27 in.	19 in.
At fire-room bilge . . .	16 in.	20 in.	19½ in.

The day opened clear excepting a bank of cumulostratus and stratus clouds to W. and S. W. Rising barometer from 30.05 to 30.28, and temperature falling to minus 37° at noon and rising to minus 28° at midnight. Early daylight at 7.30. High dawn. At noon rosy flush in sky to southward, showing clearly the position of the sun.

Danenhower's case has so far become worse that the doctor to-day informed me that unless an operation were performed he would in all probability lose the sight of his left eye. The circumstances of our surroundings, the poor accommodations for sick people, and the possible emergency of our having to abandon the ship and take to the floe, make the performance of the necessary operation a risky affair for Danenhower. For, should he be exposed to hardships and privations incidental to a march over the ice, he would quite probably lose the eye. Under the circumstances I advised the doctor to give Danenhower a voice in deciding for or against the operation. After some consideration Danenhower decided to have it done, and it was beautifully performed by Dr. Ambler, and borne with heroic endurance by the patient. I hardly knew which to admire the most, the skill and celerity of the surgeon, or the nerve and endurance of Danenhower.

January 23d, Friday.—A continuance of the same story: a leaky ship requiring all our endeavors to keep her free. The auxiliary steam-pump in the old galley-

room is going all the time, and the steam-pump in the engine-room about one half the time. Nindemann and Sweetman (the only two men who can be trusted not to break tools in this cold weather) stand watch and watch day and night in the fore peak building the bulkhead. By midnight all but the last upright plank is in place, and stringers and braces are being fitted abaft of it to resist pressure when the water comes against it. Early in the morning we broke out a barrel of plaster of Paris, which had been provided for the naturalist's use, and we shoved that down between the frames, hoping it would mix with the water there and harden to a cement. We also rammed down another lot of ashes and picked felt.



From Mr Newcomb's Sketch.

The ship is wretchedly wet and uncomfortable. The berth deck is kept moist from the endless travel along it to the fore peak; the galley-room is wet, of course, from drippings from auxiliary pump; the deck-house is wet from the Baxter, and the quarter deck is covered with ice or sludge from the fire-hose discharge. The outlook is somewhat discouraging when contrasted with the ambitious beginning of the voyage. But as the darkest hour is just before the dawn, we may have a bright spot in our future.

January 25th, Sunday. — Pump, pump, pump — the same old story. As fast as we pump out, the water comes in. Nindemann and Sweetman, by hard work

together all day, finished calking the bulkhead across the fore peak. If I kept these men continuously at work, I suppose in three days I should have Sweetman on the sick list. Nindemann will overtax his great strength without admitting that he is fatigued. So as all our skilled carpenters' labor is in these two I must husband their strength as much as possible. Some would-be wise person may ask why I did not employ the whole ship's company, and why I limit the work to two men? To such a question I here reply that the work of stopping or controlling this leak effectually must be well done and by skillful hands — and space as well as other considerations permit of these two only.

At 1.30 P. M. I read divine service in the cabin. The day opened clear and pleasant, with very fine snow dust and light E. N. E. airs. From ten A. M. to three P. M. the atmosphere was remarkably clear. At twelve, from aloft was seen the upper limb of the sun much distorted by refraction.

Danenhower's case is again becoming very disquieting. The continued confinement is telling on his general health, and his failing to improve under treatment worries him greatly. Being of a very sensitive nature, he feels that he is not doing any duty for the expedition, and that worries him. We try to encourage him all we can. He accepts our kind words at their full value, but knows they do not in any way alter facts. The doctor is very anxious about him, and speaks of the stubbornness of the case and the probable necessity of another operation. My anxieties are beginning to crowd on me. A disabled and leaking ship, a seriously sick officer, and an uneasy and terrible pack, with a constantly diminishing coal pile, and at a distance of 200 miles to the nearest Siberian settlement — these are enough to think of for a lifetime.

January 26th Monday. — The beginning of this day finds us at our usual occupation: running pumps and trying to stop leaks. We continue to hold our own against the water, and that is about all. Of course our bulkhead across the fore peak presents no obstacle to the passage of water aft between the ceiling and planking, and the ashes and plaster of Paris have not got down to the bottom of the spaces between the frames. We therefore set to work to-day to rip out the ceiling above and below the bilge strake on each side. This was a hard operation, for the ceiling below the bilge strake is of teak, and had to be literally splintered out. The ceiling above was of lighter material and more easily removed. All day was required to do the work, and to stuff oakum down well alongside the keelson, and drive plugs wherever a jet of water showed itself. We had the satisfaction, however, of seeing some good results, for as we plugged up below the water came up and out above; and, therefore, if we can succeed in filling up the frame spaces there will be so much less room for water to flow through, and we may dam it up in the fore peak. Unfortunately all this takes time, and, while we are progressing slowly, our coal is burning rapidly at the rate of nearly a ton a day.

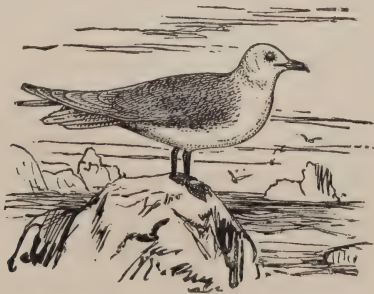
We moved the Baxter engine and boiler forward to-day, and connected it with the gearing made by Melville to the spar deck bilge-pump. It worked beautifully, doing as much work as the auxiliary pump. The event of the day, however, was the reappearance of the sun! the sun! in all his power and majesty. All hands turned out to see him and to enjoy his light while it lasted. The pleasing novelty of seeing genuine sun shadows for the first time in seventy-one days was thoroughly refreshing. Although the glare was

trying to the eyes, making me blink like an owl at first, I could not get enough of the pleasant sight.

I noticed, upon examining carefully every one who came near me, that we have a bleached appearance, which is, I suppose, natural to all Arctic voyagers, and not to be wondered at, considering our steady living by lamplight, and the difficulty of getting proper exercise in this low temperature. However, we are all healthy with one or two exceptions, and I think we may congratulate ourselves on having passed the night of the Arctic regions so successfully.

As if to give us as much light as possible on this eventful day, when the sun was on the meridian to the southward, the full moon was on the meridian at the northern horizon, so that for these twenty-four hours we had either sunlight or full moonlight all the time. We managed to find a piece of floe some little distance from the ship, which had not been underridden by a second floe, and we cut through it and sounded in thirty fathoms, muddy bottom, with no indicated drift.

Our old friend, the north side of Wrangel Land, was in sight to-day quite plainly after the sun went down, on about the same bearings as when last seen and recorded.



The Ivory Gull.

CHAPTER VII.

THE RETURN OF DAYLIGHT.

27 January — March, 1880.

The Pressure on the Ship. — Diminution of the Leak. — Lunar Halos. — Bears and Bear Meat. — Engineering Contrivances. — The Amount of Salt in Ice. — Experience of Weyprecht and Morse. — Condition of the Dogs. — Forebodings. — Observation under Difficulty. — Washington's Birthday. — Protection for the Eyes. — Cheerfulness of the Crew. — The Thermometers. — Damage to the Ship. — Trench Digging. — Soundings and Drift. — Fresh Potatoes. — An Auroral Display. — Examination of Dr. Kane's and Dr. Walker's Statements of the Presence of Salt in Ice. — St. Patrick's Day. — Ice Formation.

JANUARY *27th, Tuesday.* — The day begins clear and pleasant, with bright starlight and moonlight, and a light air from E. by S. At one A. M. it fell calm, and almost immediately after a light air came out from W. by N. No sooner had the shift occurred, although the wind was so light as not to turn the anemometer cups, than the ice began to move. I am convinced by this time that although the ice is subject to a tidal motion, it is also quite sensitive to wind. With easterly wind we and the ice drift together, as a general thing, without risk or confusion. But let a sudden shift to the westward occur and we bring up all standing, and are beaten back with a pressure that makes us in trouble again. If, therefore, there is open water in this part of the world at this season of the year, it is to the

westward of us toward the New Siberian Islands. At two and three A. M., and two, three, five, eight, nine, and eleven P. M., the ice was in motion, grinding and groaning to the S. W. and close to us. The ship was nipped on these occasions, and cracked and snapped loudly, all the pressure seeming to come abaft the mainmast. At the last nipping I was down in the fore peak looking at the leak, and had no knowledge of the ice being in motion, no sound either of motion or pressure having reached me. Upon coming aft Mr. Newcomb met me with the information that the ice had squeezed us hard. The cabin door keeps a good record of the squeezing, for at times it takes two of us to open it, although a good bit of it has been planed away. When the pressure subsides, it does so without our being able to detect it otherwise than by the easy manner in which the door opens. The beams of the poop seem a little bowed out of shape from these repeated squeezes of the frames to which they are bolted.

Weather, as a general thing, cloudy and overcast. We did not, therefore, see the sun to-day.

At the beginning of these twenty-four hours the limbers under the coal bunkers seemed to become entirely clear, for the water came aft as pure as sea-water, and with such freedom that the auxiliary pump speedily sucked. It was, therefore, stopped, and all the work was brought on the Sewell pump in the engine-room. To our great relief this, running at the rate of fifty strokes a minute, held the water in check, and as the ready flow of water aft kept the fore peak much drier, we are able to proceed with good effect in the plastering and ramming of oakum. Although we have had to work hard and wait patiently for results, the results have come at last and give us good heart to proceed.

Melville, upon calculating the work done by this pump, showed that it was pumping out of the ship 2,250 gallons per hour, and holding the water in check. This may be taken, therefore, as the amount of the leak to-day, which, compared with the amount pumped out per hour on the 23d, 3,363 gallons, shows that we have diminished the leak over one third. We are still at work at the spaces, and cannot hope to get the work completed so as to try the Baxter combination bilge-pump before Friday or Saturday night.

January 28th, Wednesday. — The success achieved by the filling in spaces holds good to-day, for all the pumping has been done by the Sewell-pump, running fifty strokes per minute, at which rate the water is prevented from gaining on us. Water in fire-room bilge, eighteen inches at eight A. M., seventeen and one half inches at four P. M., and sixteen inches at midnight. Nindemann and Sweetman worked all day from nine A. M. to eleven P. M. in filling up spaces, etc., and they are doing a marvelous amount of work. We cut holes through the ceiling to-day above the berth deck to get spaces filled in above the water line, if possible; and we are slowly but surely advancing to the time when we can try if the Baxter can keep us dry to the great saving of our coal pile.

The ice moved at 6.15 A. M., and 6.50 P. M., in the S. W. near the ship, and caused us to experience a moderate nip. Except from the snapping and cracking of our bolts and timbers, we are not disturbed. When soundings were taken to-day, new ice to the depth of eight inches had to be cut away, the result of twenty-four hours direct freezing. The floe, through which the hole was cut originally, had a thickness of twenty-four inches direct freezing since January 19th,

for this was one of the water lanes opened in the smash up at that time.

January 29th, Thursday. — I am able to record a still further diminution of the leak. The work of filling in the spaces between frames, etc., has proceeded all day, and we now find that the Sewell pump, running forty strokes a minute, has been able to hold the water in check. The amount of water pumped out has been 1,800 gallons per hour; and comparing this with the 2,250 gallons per hour on the 27th, shows that two days' work by Nindemann and Sweetman has diminished our leak 450 gallons per hour. The work is still proceeding. In order still further to economize coal a stove was started in the deck-house to-day instead of continuing a fire in the Baxter. Heat is necessary to save the spar deck bilge-pump from freezing, but when we can save it by burning fifty pounds a day instead of one hundred pounds, we are bound to save the fifty.

January 30th, Friday. — Nindemann and Sweetman continue their slow and tedious job of stuffing plaster of Paris and ashes in the spaces between frames, etc. The water, being unable to get abaft the fillings readily, rises between the frames and the outside planking and trickles out under the berth deck at the shelf. Still we are gaining on the leak, and I hope that when we get the spaces filled up inside to a level with the water outside, and have choked up the limber holes in the cant frames (for I believe they exist), so that we have got a ready means of passage interrupted, we shall be able to keep water out of her to a reasonable extent by the use of the spar deck bilge-pump connected with the Baxter boiler.

Melville, with his never-failing readiness of resource, has commenced a piece of work by which he will run a

bilge-pump belonging to the main engine by the steam-cutter's engine and boiler, so that if he can pump out the bulk of the water forward by the Baxter rig, he can take care of what comes aft with the steam-cutter's rig. We are, of course, husbanding our fuel to the utmost, and since stopping the auxiliary pump have greatly reduced our expenditure. Sounded at noon in twenty-nine and one half fathoms, muddy bottom. A slight drift indicated to N. W. Early daylight at 6.30. Upon cutting through the ice for soundings ten inches growth in one day had to be cut away. At five P. M. a slight ice movement occurred one hundred and fifty yards to southward of the ship, causing her to experience a moderate nip. At 5.40 a meteor, in falling from S. towards S. W., showed a blue colored light. At seven, faint auroral gleams in N. At eleven and midnight, a lunar halo 6° in diameter, showing prismatic colors; and at the last named hour a faint auroral arch from E. to W. 60° in altitude to northward. Temperature fluctuating; beginning at minus 36° it goes down to minus 42° , and ends the day at minus 39° .

We are certainly having enough cold weather this month, but since the sun came back we do not mind it much. The pleasure of being out in the sunlight will make us forget the cold. But generally we have had light airs about noon since old Sol's return, and by looking out for our noses we can go about with impunity.

January 31st, Saturday. — The day opens and continues pleasant and clear, except a haze which hangs around the horizon. At one A. M. a lunar halo was observed, 6° in diameter, and showing prismatic colors. (I have remarked that these lunar halos are with us almost positive evidence of ice openings in our neighbor-

hood; the liberation of water at a temperature of 29° or 30° to the action of the air at minus 29° or minus 30° always occasions a mist, which, rising by natural laws, interposes between us and the moon and causes us to see that luminary dimly. As its distance from us increases it forms the halo. Snow dust occasions a similar phenomenon with the same peculiarity of color.) At eleven the sun was about 3° above the horizon, being much raised by refraction. At six A. M. faint auroal arches or bands shedding diffused light.

We succeeded to-day in thawing the delivery-pipe in the ship's side, so as to discharge the water through it instead of pumping it through the fire connection on deck, and that saves us from a steady fear of the hose freezing up.

February 1st, Sunday. — We ended the month of January with the steam-pump going, and we commenced the new month of February in like manner. The steam-pump is kept going all day, and although it is the only one working manages to hold the water in check, going forty strokes a minute, equivalent to pumping out of the ship 2,250 gallons an hour.

At midnight, ending this day, Nindemann and Sweetman had managed to clear the limbers completely on one side of the ship chock aft to the fire-room, and in consequence the water flows aft as freely as it enters. At one P. M. the Articles of War were read and the men mustered, after which I inspected the ship. Of course, everything forward was damp and disagreeable, but we can hope for no better luck with two thousand two hundred and fifty gallons coming into her per hour. At 1.30 I read divine service in the cabin. At eleven A. M. an Arctic fox (white) was seen close to the ship. The dogs went for it, and the poor thing ran for the

gang-plank, as if to come on board for protection. Alexey, however, met it with his rifle and killed it. In its stomach were found some lemmings' tails and nothing else. Immediately thereafter a bear appeared, and Chipp succeeded in killing it, and to my great satisfaction we have again fresh meat hanging in the rigging. The bear weighs about four hundred pounds, and its stomach is absolutely empty. I hail with great satisfaction this evidence of animal life, for it will enable me to make a very acceptable change from our canned meat diet. In connection with this subject, I may as well remark here that beyond a doubt canned fresh meat is far superior to salt provisions. But it requires a greater amount to satisfy hunger, and one soon becomes weary of it because of its tastelessness. All canned meat seems to taste alike. Such a thing as canned turkey and canned chicken is a delusion and a snare. There is such a hopeless confusion of smashed bones and small pieces of meat that we have unanimously called the resulting dish a "railroad accident."

At nine P. M. a meteor was observed falling from N. E. to E. At ten the ice commenced to grind and move, the general direction of the movement being from S. to N. At midnight the sky became suddenly completely overcast, and while I was concluding that this sudden darkness was due to ice openings presenting warmer water to cold air, my conclusions were verified by the ship receiving some severe nips. A careful examination of the surrounding ice showed no sign of disturbance, nor was there a sound of movement anywhere. But I am satisfied that there was an ice opening somewhere near the ship.

February 2d, Monday. — Upon calling me this morn-

ing, the steward informed me that another bear had been killed, "and that he had tried to get in the deck-house." Supposing that we had become careless in lookout, or the bears had made an invasion, I turned out and inquired. The facts were that a bear had come near the ship at seven A. M., his presence being denoted by the dogs retreating on board in a body and manning the rail, barking at his bearship. While the quartermaster was summoning Chipp, the bear, attracted by the meat of his brother already hung up to a girtline, attempted to climb up the ship's side to get on top of the deck-house, but fell back. Seeing the gangway board, and recognizing its use no doubt, he was about to march up it, when Mr. Dunbar appeared at the rail and fired at him. The bear, wounded only, made off, and the dogs followed him. He sat down to keep the dogs at bay with his fore paws, bleeding very freely, and in that position Mr. Dunbar dispatched him. He was eight feet one inch long and weighed nine hundred pounds, forming a welcome addition and change to our larder. His stomach contained several small stones resembling pieces of slate, and nothing else. Alexey while out this morning saw a walrus, and brought back a shell which he had heaved up. For a wonder Alexey was without his gun, or else we might have laid in a supply of dog food. Our fish, except forty days' rations packed on the sleds, is all gone, being finished to-day, and we must now commence on our prepared dog food of meat and bones supplied by Mr. Newman at St. Michael's. We find considerable breaks in the ice near the ship this morning, accounting for the sudden cloudiness and haze at midnight last night.

Melville keeps on making the combination of the steam-cutter's engine and boiler to the bilge-pump of

the main engine. He tried the combination to-day, using steam from the main boiler, and found that the engine had to run so fast to develop the necessary power to work the pump without the engine catching on the centre that the pump was driven too fast to lift any water. Hence he has to make a gearing to regulate the work of the pump, and, energetic as he is, to see an improvement is to commence to make it. At one P. M. the ice began to move, and from that time until eight P. M. we were getting nips and pressures at a few moments' interval. We are so accustomed to these alarms now that we take them quietly, thankful when they end, and knowing we are helpless pending their duration.

February 4th, Wednesday. — The Sewell pump is kept going all day as usual, but we find that by running it thirty-five strokes a minute we hold the water in check; that is, keep it at a uniform depth of sixteen inches in the fire-room. We have reduced the amount of leak 282 gallons an hour within the last few days, and 1,695 gallons an hour since the first occurrence. Were it not for the expenditure of fuel we should be doing first rate; but when we burn 1,200 pounds of coal a day, and have only eighty-five tons left to-day, it is not only a matter of simple calculation to find out how long it will last, but it seems to make our staying out another winter a matter of considerable doubt. We are driving ahead, trying to hurry up the steam-cutter arrangement, hoping, while the Baxter pumps forward, the cutter-engine will pump out aft, and let us do away with fires under the main boiler. This will reduce our coal expenditure fifty per cent. Nindemann and Sweetman have about finished the filling in business, watching their work now to ram in more ashes as fast as old fillings settle.

The surgeon hands me in the report of his monthly examination. The men are generally in good condition, and there is some falling off among the officers in weight. Danenhower's case is pronounced a very critical one, it being a matter of certainty almost that he will lose the sight of his left eye. The condition of the officers is classed thus: excellent, one; good, five; fair, one; poor, one. Of the twenty-three men, excellent, eighteen; good, five; and the natives are in excellent health. We commenced to get our provisions in some kind of order on the quarter deck and in the deck-house. When the leak occurred, everything was hurriedly broken out of the hold and store-rooms forward and placed anywhere.

February 5th, Thursday. — The Sewell pump is kept going all day at the rate of thirty-five strokes a minute, holding the water in check with that work; sixteen inches of water stand in the fire-room bilge all day. Lest any one should read this journal without my being on hand to explain the question, Why is not the sixteen inches pumped out at once, and the ship kept dry at the rate of thirty-five strokes of the pump per minute? it may as well be answered here: The ship is heeled 3° to starboard, and naturally the greatest accumulation of water takes place on that side. But the suction of the Sewell pump is on the port side of the keelson, and the only communication from one bilge to the other is by a small hole about large enough for a piece of eighteen thread ratline stuff to reeve through. We tried to bore larger holes, but the keelson is so full of bolts and fastenings as to stop us. Hence the water must be allowed to rise until it will flow over the keelson to port, in order to take it out by the Sewell pump.

Melville keeps driving ahead at his combination of

the steam-cutter's engine with the bilge-pump of the main engine. Everything now is waiting for that. It is possible that I might pump all the water out by the power of the Baxter engine connection with the forward spar-deck bilge-pump (or, at all events, keep a good control over the leak), were it not that some water would come aft to the water-tight bulkhead. If this is not pumped out it will at once freeze, unless a fire is kept going to heat up the engine-room while it is pumped out by hand. Pumping by hand will use up my crew, and should we be obliged to leave the ship in a sudden smash-up, I would have an exhausted body of men to lead over the ice two hundred miles to a settlement. If the water freezes in the ship, more damage may be done in a day than we could repair in a month. To keep up fire enough to prevent its freezing while we pumped by hand, would use up as much coal as is now required for the main boiler. Hence the wisdom of burning that amount of coal in the manner which will save exhausting the men. If the steam-cutter's engine will do the work with the Baxter boiler forward doing its share, we shall save one half our fuel, or in other words, make it last twice as long.

From nine A. M. until three P. M. the north side of Wrangel Land was in sight. Measuring with the sextant from the sun at noon we get the following bearings: Most eastern visible extremity of land S. 13° W., most western visible extremity S. 21° W., direction of ship's head S. 49° W. It is quite evident to me that but a portion of the land was seen this time, for upon other occasions it covered a much greater angle, and our change of position, in the mean time, has been toward it instead of away from it. Early dawn at six. At eleven the ice was in motion to the S. E.

February 6th, Friday. — The rig whereby the steam-cutter's engine it is hoped will work the bilge-pump attached to main engine being finished, trial is had of it to-day, getting steam from the main boiler. I am sorry to say the trial is unsatisfactory. The engine is not powerful enough to do the work which the pump is prepared for. A description of the apparatus may well come in here. On the shaft of the steam-cutter's engine is secured a wooden pulley six inches in diameter. Above it is secured a frame and shaft to the hanging coal bunker, and on the shaft is placed another wooden pulley eighteen inches in diameter. Around the two pulleys is an endless belt. On the end of the upper shaft is a crank, which, by a connecting rod, works a break attached to the bilge-pump. Theoretically it ought to work, but practically it does not, for this reason: The discharge pipe of the pump is long, and has many angles before it reaches the ship's side. The pump being a force-pump of six inches stroke, and the engine being four and a half by six inches, were the delivery at the pump, it would be an easy matter; but as the delivery has to be made through a sinuous pipe one and a half inches in diameter, the water chokes in the pipe in such a way as to make the little engine struggle and labor, and occasionally come to a stand. Greater steam pressure would force the water no doubt, but the little engine would not stand the racket. While Melville was trying in every way to solve the difficulty, it was discovered that the delivery in the ship's side was frozen, and while we were thawing it out the day ended. Should no better result occur, Melville will go to work to make the pump smaller by inserting two small plungers and filling it with Babbitt's metal. The day opens and continues fine. Temperature increases

from minus 32° to minus 23° , and falls again to minus 26° . Eight inches of ice formed over sounding hole since yesterday. Upon attempting to measure the present thickness of the floe, which, on the 4th, was five feet four inches thick, it was found that another floe had shoved in under it. I am inclined to think that has been the case all around us, and that perhaps our controlling the leak has been due to the underlying floes of ice uniting by freezing and lowering the water head in the vicinity of the leak. If that be the case, we shall have our hands full again at a breaking up.

February 7th, Saturday. — I remarked in yesterday's journal that we discovered the pipe of the main engine bilge-pump frozen solid, and that while we were thawing it the day closed. At the same time the crank was shortened so as to diminish the stroke of the steam-cutter's engine. Everything being in readiness we gave the rig another trial, but it would not work satisfactorily. True, it did pump water, but with such jerky and labored efforts on the part of the engine that we could readily see it was being overtaxed. The pump was too large for the engine. The rig was therefore discontinued, while Melville put his people at work to boush the pump with Babbitt's metal, and insert a smaller plunger, converting a single-acting piston-pump of six inches diameter into a single-acting plunger-pump of three inches diameter. This will take a couple of days, and in the mean time steam must be kept on the main boiler. At the end of the day I am thinking of trying the Baxter pump alone.

At nine the sun was raised a full diameter above the horizon by refraction. Extraordinary mirage from nine until afternoon. Extremely variable winds, at times shifting sixteen points at once. Mirage affected by

shifts of wind. Wrangel Land sighted S. by W. At two it was much raised by refraction and inverted by mirage.

February 8th, Sunday.— Upon inspecting the ship at noon to-day I found the temperature in the deck-house to be 18° , and lest our bilge-pumps should freeze beyond our control, I ordered a fire to be lighted under the Baxter boiler. As it will be several days before the work is finished which Melville has on hand, I thought this would be a good chance to see whether we could control the leak by the Baxter and the bilge-pump alone. Accordingly when steam was ready in the Baxter we closed, or rather attempted to close, the gates in the water-tight bulkhead. The port gate went down all right, but the starboard one seemed to be out of gear, for we could not get it down all the way, nor open it wide. To get at the gates, access must be had to a little space between the after bulkhead of the forehold and the forward side of the coal bunker. We commenced to break out the provisions and other stores with which this space is filled. The work of pumping the water, up to three P. M., had been done by running the Sewell pump thirty-five strokes per minute. When the Baxter commenced to run, the Sewell was put in operation only fifteen minutes in every hour. But it must be borne in mind that the bilge-pump suction is six inches from the bottom, and that the water has to flow over the keelson in the fire-room before the pump can take it. Our experiment has come to nothing, because, owing to leaky gate, water will flow aft into fire-room, and a pump must be kept going there.

I found the ship in as orderly a condition as could be expected under the circumstances. Everything being broken out from below forward, had to be piled up in

the deck-house and on the quarter deck. The berth deck was damp, considerable moisture standing on the beams overhead. Until this injury to the ship the crew always had the deck-house to go to for a change, but now most of the time has to be passed on the berth deck because the deck-house is full. With a temperature ranging between minus 40° and minus 47° they cannot be sent out for very long from the ship, and as there is no open water we have no seals to occupy our attention. Read divine service in the cabin.

We are being favored with beautiful weather. It is so long since we have had a strong wind that I cannot remember when we had our last. The sun shows up brightly day after day, the daylight grows longer steadily, lasting now from seven A. M. to five P. M., the nights are bright with starlight, the ice seems quiet, and were it not for cold snaps that keep us shut up, we should get over many a mile of ice in exercise, in celebration of our farewell to our Arctic night. Chipp and myself still stand our twelve-hour watches; he from four A. M. to four P. M., and I from four P. M. to four A. M. This is rather wearing, for it obliges me to turn part of our day into night in order to get enough sleep, but as Danenhower is still *hors de combat*, there is no one to make share it — unless I include Dunbar, and I do not do so, because, in the critical condition of things I am of opinion that some one should be around at all times with full authority to act promptly and decidedly, and the fewer people have that authority the better.

The day began and continues clear and pleasant, but with considerable haze around the horizon. Winds beginning at N. W. back to W. Barometer begins 29.93 and rises to 30.04; the temperature begins minus 42° , and by nine A. M. reaches minus 49.5° , when mercurial

thermometers decline to work longer and the mercury freezes solid; spirit thermometer No. 4,402, at that time reads minus 47° and goes down 2° more before end of day. As the spirit thermometers are not reliable it is safe to assert that it has been to-day below minus 50° .

An alarming amount of carbonic acid gas, 5.304 volumes per thousand, or .5304 per cent., was found on the berth deck at eleven P. M. Seeking for a cause I found that in the press of things requiring our attention of late, the iron ventilating pipe over the berth deck skylight had not been kept clear of ice, being in fact chock full of a solid mass, and effectually preventing the exit of foul air or the entrance of fresh air. Had it cleared.

February 9th, Monday. — There is very little to record to-day in the form of a change. Resuming work early this morning we broke out all the provisions and other stores contained in the little store-room, between fore hold and coal bunkers, in order to get at the flood-gates. We found that the port gate was tightly closed, and that no water flowed through on that side. On the starboard side, however, the case was different. Owing to an accumulation of rust and dirt, the long rod from the spar deck extending to the end of the screw thread on the spindle working the gate failed to bite the screw thread, so that turn the rod as we might it would neither close nor open the gate. Clearing away the dirt and rust we finally got the gate shut, but found that enough water leaked through into the engine-room to require the Sewell pump to be kept running fifteen minutes every hour. However we are holding our own. This experiment had to be tried before we attempted to rely on the steam-cutter engine doing the work which might escape from the Baxter

pump. We are satisfied that it can, and now we must see if our gate can be made so tight as to make the Baxter engine do all the work. To get at the gate we have to rip up a heavy flooring and that takes time.

February 10th, Tuesday. — Upon getting down to the gates in the water-tight bulkhead we found that the starboard one was neither broken nor sprung, both seeming perfectly tight, that is, no leak was apparent through them. There must, therefore, be some leak through between the frames and the planking to account for the water finding its way abaft this bulkhead, but as it is impossible for us to get at its exact locality, we can as yet see no way of remedying it. By running the Sewell pump sometimes five and sometimes ten minutes every hour, we hold the water in check in the fire-room bilge; while as fast as the water banks up forward of the water-tight bulkhead it is pumped out by the bilge-pump run by the Baxter engine. This is, however, kept running nearly all the time.

February 12th, Thursday. — Although unable to find any leak through the water-tight bulkhead, the carpenters (Nindemann and Sweetman) have been employed, touching and filling up all doubtful places. By the stupidity of one of the firemen (Boyd) we were able this morning to decide that the leak does not occur in the bulkhead itself or through the gates. In order to keep the Baxter boiler from choking up with salt it is our habit to blow it out once in twelve hours. Before blowing out the fires are hauled, and new ones built when required. Boyd attempted to blow out without ascertaining whether the out-board delivery pipe was clear or frozen. As a consequence, the pipe being frozen, so much time was lost before the pump could be started again, that thirty inches water had accumulated for-

ward of the water-tight bulkhead, and then Nindemann heard a noise of water falling like an overflow, while he was abaft the bulkhead. Upon examining, and listening attentively, it was located, as exactly as could be under the circumstances, as coming from between the planking and frames outside of the bulkhead and abaft of it. As a necessary sequence the water rose much higher in the fire-room bilge. As soon as the Baxter boiler could be got to work again the water was speedily reduced to twenty-two inches, when the overflow ceased, and only the usual small amount, that is, one half inch per hour of water, found its way aft into the fire-room. The steam-cutter's boiler being in readiness, steam was got on it to run the steam-cutter's engine in connection with the converted bilge-pump of the main engine. The combination worked well, pumping out dry the engine-room bilge. It was found, however, that the furnace of the cutter's boiler was too small to keep up a continuous pumping, the steam running down too low whenever the fire was cleaned or the boiler was being pumped and blown. As we want to be sure that this little boiler will do all that is expected of it, and shall be in its most efficient state, ready to answer any sudden demand, Melville proposes to cut down its bridge wall, take out its nine-inch grate bar, and insert one sixteen inches long, thus increasing its grate surface from 144 square inches to 256 square inches. This is immediately commenced, and to-morrow I hope it will be done, and we shall be able to dispense with the main boiler altogether.

A bear came near the ship at seven A. M., but being frightened by the dogs made his escape before any one could get a shot at him.

February 13th, Friday. — Completed the work of re-

moving the bridge wall of steam-cutter's furnace and placing in the furnace sixteen-inch grate bars instead of nine-inch ones. Got steam on the cutter boiler again, and found upon lengthened trial that the alteration before mentioned made it possible to work the rig continuously to main engine bilge-pump, and thus keep the bilge nearly dry. Hauled the fires under the main boiler, ran all the water from it, and drained out all engine and boiler-pipes to prevent their freezing, and pumped the bilge dry with the steam-cutter's rig.

At last we have succeeded in reducing our fearful expenditure of fuel to a reasonable amount; 400 pounds of coal a day will now run our two steam-pumps, and that is much more comforting than burning 1,000 or 1,200 in the main boiler furnaces. Enough water accumulates forward of the water-tight bulkhead to require the steady running of the Baxter rig, and enough gets aft through "between frames" to occupy the steam-cutter's rig continuously. The crew were kept busy all day in trimming down the coal in the after bunkers so as to get a place ready for receiving some of our provisions. With the spar deck and deck-house all lumbered up, we should be in a fearful mess if the ice were to heave us around, and I have concluded to make use of empty coal bunkers as provision rooms. While water is coming into the ship forward we cannot restow in the fore hold or flour-room anything that would be injured by dampness, even if prudence did not dictate keeping those places clear in the event of any fresh mishap. Water continues to mount up between the frames and planking forward of our bulkhead in the fore peak, and trickles out along the berth deck, keeping everything damp and nasty. Nindemann and Sweetman keep at work trying to stop this by putting in fresh fillings where old ones have settled.

Referring to my remarks on December 14th, in relation to Weyprecht saying, "Beginning at a certain thickness the ice is almost free from salt," it may be as well to state here the result of our examination of the ice in which we are drifting. A piece of floe ice, formed from direct freezing, and three feet nine inches thick, was selected for examination. The following are Dr. Ambler's figures for the result of his test (Parke's test). (See Appendix E.)

Number of grains of salt per gallon of sea-water equal	2045.
Number of grains of salt in cube cut from upper five inches of our block	548.06
Number of grains of salt in cube, cut from lower five inches of our block	347.25
Number of grains of salt permissible in potable water	10.

From which it will be seen that the "certain" thickness has not been attainable by us, for we cannot find a single piece of floe from which we can get potable water, and since it seems never to snow up here we have to distill every drop of water we drink. If, as Weyprecht says, the salt is all crystallized out during the winter and washed off during the summer, the upper layers of old ice remaining ought to be fresh; but in our experience they were as salt in September last as the new floes are salt now. We may be having phenomenal ice, but I hardly think so. If all, or nearly all, the salt resulting from the freezing of sea-water comes to the surface as efflorescence, and is washed off into the sea during the following summer; and if the exposed upper ice then melts by the action of the sun's rays and is in its turn frozen in the fall, squeezing out again a small residuum of salt, I can understand that

the refrozen ice may be purer than the ice newly made. But that it contains less than ten grains of salt to the gallon I am not so ready to admit. In face of Weyprecht's assertion, I do not intend to urge that he was guided by taste rather than chemical test. I will simply remark that we have not been able to find ice, old or new, surface or subaqueous, that would be water proper for men to use continually. Dr. Morse, of the Nares Expedition, says, in his testimony before the Court of Inquiry, that he tested the water obtained from the melting of ice on the top of a floeberg and found it pure. The inference is that he tested it analytically. But I have had an idea for some time that the outbreak of scurvy on board the English ships may have been due to the continuous use of water which, though pure enough to the taste, was unfit for consumption. For instance, I find that our washing water, which is obtained by scraping such floes as have retained or accumulated a little snow, is not objectionable to the taste, but yet it contains 28.63 grains of salt to the gallon, and would be highly injurious if used steadily. Since the occurrence of the leak, and the use of the Baxter boiler to run a bilge-pump, our distilled water has been made by the main boiler. As this was shallow some salt was carried over from it to the distiller, and the resulting water showed 13.49 grains of salt per gallon. This, of course, was too much, but we have been in an emergency where purer water was not possible. Now that we have hauled the fires under the main boiler, the distilling has to be done by the steam-cutter's boiler when it is not pumping the bilge out. As this boiler is fed from the bilge, the drinking water is made from the water leaking into the ship. Until we began to drink it we were under the impression that it,

the boiler feed, must be pure salt water, for so much water has flowed into the ship and been pumped out that our bilges are as clean as a whistle. But upon tasting and testing it we find it has an unpleasant taste and odor. With sea cocks frozen solid in their seats, getting a supply from the sea was no easy matter; and a thawed valve soon froze hard again with an outside temperature of minus 35° to minus 40° . However, Melville managed to get a Kingston valve open, so that we can feed our little boiler from pure salt water and not bilge water, and now I do not anticipate any difficulty. One of my ideas that fresh water, that is, fresh enough water, could always be obtained in the Arctic regions, has been thoroughly exploded.

February 14th, Saturday. — The forward spar deck bilge-pump is kept running all day. The steam-cutter's engine, running in connection with the main engine bilge-pump, is used about one sixth of the time to pump out the fire-room bilge, and the remainder of the time it is used for distilling water for drinking and cooking purposes.

February 15th, Sunday. — Although we have succeeded in getting our pumping so perfected that we can hold the water in check without resorting to pumps worked by the main boiler, our troubles are not ended yet. The water has succeeded in forcing its way up on the berth deck on the port side, driving through the filling between the frames. As a consequence, the berth deck this morning was wet and sloppy, and uncomfortable beyond expression. Sweetman indefatigably set to work again to put in more filling, and at the same time build a little bulkhead under the berths to keep the water from flowing out over everything, while a hole bored in the deck itself will let it off into the

fore peak. This, at all events, is what he is undertaking; but if not immediately successful, I shall bore through the ceiling below and let the water come out into the fore peak directly. Men cannot keep their health in the wet and damp now on our berth deck. The drip from condensation is also very bad, the two forward and two after berths requiring rubber blankets suspended over them to save the bedding from getting wet. Verily, all our troubles are coming upon us at once.

Usual Sunday inspection at one, and divine service at 1.30. The ice began to get uneasy, giving us several severe shocks before midnight.

February 16th, Monday. — Since getting the sea-water through the Kingston to the steam-cutter's boiler, instead of feeding it directly from the bilge, we have no trouble about our distilled water. As the boiler has a little steam-drum on top of it, no salt is carried over from it to the coils, and we are now enjoying almost chemically pure water. We are not expending fuel for this purpose alone, however, because steam is necessarily kept all the time on this boiler to keep the fire-room dry.

Between midnight and four P. M. we received several severe shocks from ice pressure. When the walking parties went out at noon they discovered, about half a mile to the northward of the ship, a long lane of water. Sweetman was partially successful in stopping the weeping of the water along the berth deck.

February 17th, Tuesday. — Our poor dogs suffer the most in all this trouble in getting the pumps to work with but a small consumption of fuel. While we had steam on the main boiler, we were able to steam the concentrated dog food received at St. Michael's, and



Plug ugly.



Foxie.



Bones.



Kas-mat-ka.

SOME OF THE DOGS.

*from sketches
by Mr. Newcomb.*

thus make it eatable. But since the fires under the main boiler have been discontinued the dogs have had a hard time. I learned to-day that they were being fed on this concentrated food in its present frozen condition. I have been wondering for several days why the dogs fawned so much upon anybody who came on deck, and why the rattle of an empty meat-can thrown over the rail was a call to all the dogs to rush for the ship in a body. Being up all night, and getting my rest in the daytime, I lose track of some details by my not seeing them, or Chipp forgetting to report them. As soon as I learned of the issue of frozen dog food, I immediately conferred with Melville about putting a pipe in the Baxter boiler to carry steam into a barrellful of the dog food to thaw it, and he commenced to do so immediately.

Some of our dogs have poor teeth, and some seem to be going it "on their gums." These, while trying to get the frozen morsels down, are frequently robbed by the more vigorous dogs who have good jaws, and who can if necessary reduce an iron bar to proper size for their stomachs. Being unable to get sleep this morning, after my all-night watch, I went out on the floe at nine A. M., and was immediately surrounded by all the toothless dogs, who fawned upon me as if their instinct had told them I was the commanding officer, and should be appealed to to right them. I am in hopes now that the evil is remedied, and that every dog will get his food in such shape as will prove eatable.

Sounded at noon in thirty-one fathoms (muddy bottom), a northwest drift being indicated by the lead line. Ice formed seven inches in thickness over sounding hole since yesterday. We have been favored with a gale to-day with tremendously heavy squalls.

The water being pumped out of the ship of course freezes at once, and in consequence the ice on the starboard side reaches above her doubling. This naturally will hold the ship down, but we cannot help it. Working in this temperature is difficult for men, but impossible for tools. When the temperature becomes decent, say at zero, I shall have a trench dug around her to relieve this hold, but at present nothing can be done. Finding that the delivery of the hose was constantly freezing, we allowed the surface ice to cover above the scupper, and then dug a hole down underneath for the water to flow, raising the temperature of the delivery to that of the surrounding ice.

February 18th, Wednesday. — A very stormy, disagreeable day, — one of the worst we have had. The day began with an E. N. E. wind, with a velocity of fifteen and one half miles an hour. This backed and moderated until it reached N. at six A. M. (velocity six miles), the barometer then standing 28.59, — our lowest on record. There it remained until the wind backed to N. W. at seven, when it commenced to rise. Remembering that “the first rise after very low indicates a stronger blow,” I stood by for a breeze. It commenced to freshen immediately; at frequent intervals we had very heavy squalls, probably from thirty to forty miles velocity. Snow filled the air in falling, and when drifted by the wind. The temperature fell rapidly to minus 34°, and with the fierce wind and driving snow hiding everything at twenty yards, while sifting through one’s clothes, made up one of the most disagreeable days we have yet seen. Barometer reaches 29.11 by midnight.

Finding that staying up all night until 4.30 or 5.30, and struggling to get enough sleep in the day (without

reference to the extreme irregularity of my eating), was telling on me to a considerable extent, I arranged the night work in three watches, taking until midnight myself, putting Mr. Dunbar on for the midwatch, and having Chipp look out after four A. M., until some emergency arises, or I find myself equal to another spell.

Danenhower's sickness throws the work out greatly. With our small number, one less affects us seriously. His case is becoming more aggravated instead of improving. Despite all operations, it seems to be a foregone conclusion that he will lose his left eye. His case will not yield to treatment, but continues to work itself along in thorough fashion in its own regular way.

February 19th, Thursday. — Pump, pump, pump! the same story day after day, and steadily our coal supply diminishes. An average expenditure of five hundred pounds per day, or perhaps five hundred and fifty would be nearer the mark, is required to keep us warm, cook our food, and pump the ship out. A very simple calculation will determine how long we can go on at that rate. All our hoped for explorations, and perhaps discoveries this coming summer, seem slipping away from us, and we seem to have nothing ahead of us but taking a leaking ship to the United States. At the best, I do not like to contemplate any further accident, although in our position almost anything might befall us. Writing down one's sensations here is of no use. They will always be fresh enough to my mind without doubt, and a record of them would be to no purpose. Putting down things as they occur will be much the better plan. A very stormy, disagreeable day.

February 20th, Friday. — We have been carefully observing the working of both our pumps, and calculate

the performance of each in order to get as exact an idea as possible of the extent of the leak. We find the amount of the leak may be assumed to be 1647.7 gallons per hour. Sounded at noon in thirty-two fathoms, muddy bottom with shells. A small clam was brought up by the lead. A drift to N. was indicated by the line. Five inches of ice formed over sounding hole since yesterday. Clear and pleasant weather, moderate west winds. Temperature slowly falls from minus 45° to minus 46°, but I am inclined to think it is colder than is recorded. Our mercurial thermometers record below minus 40° (the freezing point of mercury being minus 39°). But how far such records are reliable is a matter for scientific consideration. One of our mercurial thermometers records minus 50°, and our spirit thermometers are generally from 3° to 4° higher (warmer). Beyond minus 39° by mercurial thermometers I consider our most careful records as unreliable.

Although we have a clear day and a clear horizon, no land is to be seen. We must therefore have drifted away from our N. side of Wrangel Land. With the high winds prevailing of late we have had no chance of getting observations, and with the cold weather we are having, one is sure of frozen fingers. In the absence of a place to erect our observatory, all our astronomical observations have to be made with sextant and artificial horizon. Care has to be taken to get the sight quickly before the mercury freezes, and as the fingers are like sticks, they do not work tangent screws readily. While working at these the horizon and index glasses frost up, and then there is nothing to do but come in and thaw out. Under ordinary circumstances our transit theodolite might be used. But apart from the difficulty of working leveling screws in this tem-

perature, the theodolite would have to be brought in-board to be read, and the transportation would perhaps alter the reading. We get along fairly well, however, all things considered, Chipp filling Danenhower's place in taking sights.

Vapor arising from the ice to the S. W. during the afternoon, indicating water hole.

February 22d, Sunday. — At eleven A. M. I inspected the ship. The result was not encouraging, so far as the future health and comfort of the men are concerned; everything in the deck-house and berth deck was either very damp or dripping wet. The heat from the Baxter boiler warms up the deck in its immediate vicinity and thaws the ice, making wet and slop; and the heat ascending to the roof melts the frost on the beams, causing them to drip steadily. Add these two things to the unavoidable drip of leaking steam from cocks, etc., of the Baxter boiler, and we have a condition of wet and damp that is disagreeable in the extreme. So much for the port side. On the starboard side the pump discharges through a canvas hose to a scupper hole, and the leakage is considerable. The stove on the starboard side keeps the frost overhead and on the side in a constant state of drip without ever drying it. These two things keep the starboard side of the deck as wet as the port side. To reach the berth deck everybody has to pass through the deck-house on the port side, and as a consequence wet and slop are carried below on everybody's feet and into the berth deck. This begins the trouble there. Then the steady flow of water into the ship under the berth deck and aft to the pumps helps to retain the dampness where deposited, and if anything is needed to complete the discomfort the drip from the beams comes in as a finish. The stove keeps

the midship berths dry and comfortable, but the forward and after berths require rubber blankets over them to catch the moisture. Since the leak we have not been able to air the bedding in the deck-house, because it would only absorb dampness; and we have to rest content with turning up all the mattresses in the berths every morning, and letting the air already on the berth deck circulate around them. Although the Baxter boiler and stove keep the deck-house warm, six of each could not keep it dry, and it is this continued dampness that I fear will eventually tell on the men. The worst of it is that we can hope for no improvement until we get moderate weather. When that time comes, I intend moving the Baxter engine rig to the after bilge-pump, and letting all the water come aft freely through the gates in the water-tight bulkhead. But I cannot do this now because the after bilge-pump stands out on the deck, with nothing more than the tent-awning to shelter it, and would undoubtedly freeze and choke up with ice while being worked.

Although the weather is terribly cold, everybody is encouraged to take exercise out on the ice. From eleven to one every day the berth deck is cleared and aired, and the men of their own accord take at once to the ice, tramping up and down near the ship, or wandering off looking for open water and seals or bear tracks. The officers are as ready to take a constitutional walk as could be desired, the cabin being thoroughly aired. We are as comfortable aft as we could wish. The ward-room is and has been perfectly dry, not a sign of drip or dampness being visible. As there never is any fire there (except Saturday night to heat water for bathing) the temperature ranges between 28° and 32°, and the officers below find that by no means

uncomfortable for sleeping. The forward bulkhead of Chipp's room and my room is constantly covered with ice, which, when the rooms get warm, thaws and drips on the deck, but as it is either wiped up or freezes again we suffer no discomfort. Our beds, being in the after part of the rooms and in-board, are perfectly dry. Such moisture as condenses on the ceiling runs down the curve of the turtle-back, lodges on the bulwark bookshelf, and is occasionally chopped out with a hatchet. But these are trifles, and I am as comfortable as possible. With good health, good appetite, and now enough sleep, I feel as if I could endure these small privations for an indefinitely long period of time. But I am considerably worried about the damp condition of the men's quarters. I see no bad effect yet upon their health, and as they are bright and cheerful, the discomfort does not affect their spirits; but I know the conditions are unfavorable to proper health, and I am anxious as to the result. We can hardly look for mild weather until April, and that is five weeks off yet.

It is pleasant to record one favorable thing, and that is, a reduction in the coal expenditure of fifty per cent. as compared with last week. Our expenditure last week was 1,021½ pounds, and this week is 564¾. At one P. M. read divine service in the cabin.

February 23d, Monday. — Washington's birthday having fallen on Sunday this year, the celebration of it was deferred until to-day. At sunrise we dressed ship with American ensigns at the mast-heads and flag-staff, and the Union Jack forward. There is no fear of contradiction when I say that this was the first time Washington's birthday was celebrated in this part of the world. Beyond flag-hoisting we made no pretense of keeping holiday. There is so much absolutely neces-

sary work to be performed daily, now that we are leaking, that there can be holiday for nobody.

Sounded at noon in thirty-three fathoms, mud and gravel. Ice five inches thick formed over sounding hole since yesterday. Early daylight at 4.50 A. M. An opening in the ice about one half mile to the southward of the ship. Full moon occurs at noon on the 25th, and we must stand by for a scare I suppose.

A bear came near the ship at midnight, but the dogs made a rush for him and drove him off before anybody could get a shot at him.

February 24th, Tuesday.—A slight shock from the ice at 3.50 A. M. and a sound of ice in motion was heard at the same time.



A Polar Bear.

At four this afternoon we sighted Herald Island from aloft. This seemed almost like meeting an old friend. It bore S., verifying our sights for position on the 21st. Bright, pleasant weather. So power-

ful have the sun's rays become that I have ordered the wearing of snow spectacles by everybody going away from the ship. At one A. M. brilliant aurora.

At ten this morning there was a great going on with the ice. The usual grinding and screaming broke out suddenly all around us, but at some little distance, say a quarter of a mile. No ice could be seen moving, but that there was motion somewhere was evident from the vapor that rose from openings in the floes. A very

curious phenomenon in connection with this was that puffs of vapor would shoot up like smoke from an explosion, too distant to be heard, and follow along in a line of possible fracture. As soon as the puff had disappeared a regular haze would rise as if from open water. The commotion went on until eleven A. M., when it ceased as suddenly as it began. We did not experience any shock or jar, and as our period of suspense and standing by was a short one, we were not inclined to regard the movement as any "great shakes." I had been looking forward to this time, the time of full moon, as a period of uncertainty, but, as often happens, the anticipation was worse than the reality. We have ceased to tremble at these semi-monthly visitations. We can see now, and that is more than half a victory. Eight hours' sunlight gives us a confidence we did not feel in November, December, and January; and as we know we are daily lengthening our sunlight, and that each day is a day nearer mild and pleasant weather, we are as bold as lions. It seems difficult at times to anticipate any mild weather with the thermometer going on serenely day after day below minus 40°. This month has been a screamer for cold.

When the ice excitement subsided this morning I went out to look for results, and I found that, although generally the floes had come together again, leaving only cracks to show where they had broken, there were a few openings six inches wide over which the ice had formed in an hour one half inch in thickness. Nobody seems to mind the cold much, we are all out every day for an hour or two at a time, and beyond a cold nose (and if it is windy, occasionally a slightly nipped one) we seem none the worse for it. Our chief trouble is

with our snow-goggles, for they quickly frost up, and we cannot see through them. If we go without them we run the risk of snow-blindness, for the glare is terrific.

The refraction is something wonderful. The shapes of distant pieces of ice change very often apparently, and small lumps look inordinately large. Occasionally we sight some enormous blocks which have been broken off and up-ended in the ice pressures. To survey these massive pieces more satisfactorily we plod through the broken hummocks toward them only to find upon arrival that a very insignificant block has been magnified by refraction. A piece seemingly forty feet in height becomes in reality about ten feet.

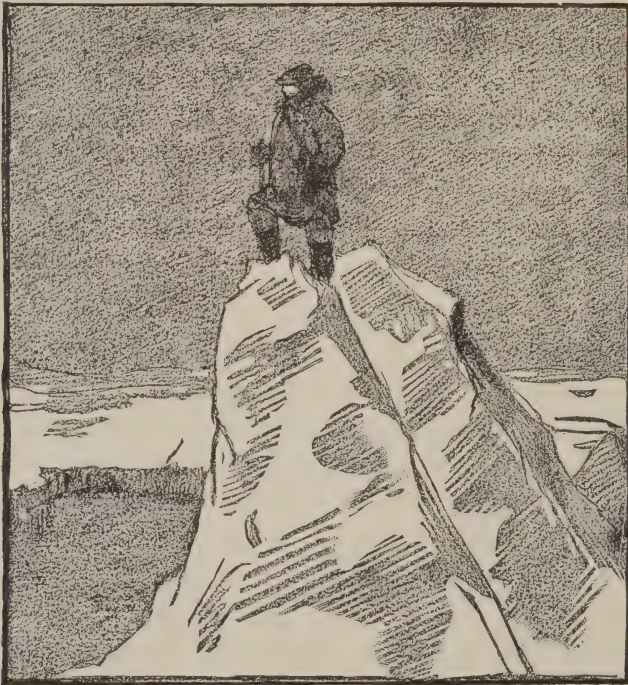
Our auroral displays are falling off in number and brilliancy. There is but one to record in these twenty-four hours. Lunar halos and circles are quite common, the mist which hangs over these openings in the ice during the day seeming to be drawn to the moon regularly and resolving itself into a halo or circle. Of late days the moon has had a "burr" around it in rising, as if she had been dipped in adhesive vapor before showing above the horizon.

February 26th, Thursday. — At ten P. M. the Baxter boiler and engine commenced working the forward spar deck bilge-pump again. This made a pleasant relief for the men, who found the pumping by hand no sinecure. It would be an unpleasant feature of our cruise were the pumping done by hand, for doubtless it would soon break our men down. Valuable as our coal is, the expenditure of two hundred and fifty pounds per diem for pumping is a wise measure, and not to be considered in comparison with the continued pumping by hand and wearing out of men's health.

This unbroken monotony of life, with the steady strain on the mind of perpetually standing by for a mishap, is very wearing, and calls for all of one's nerve to keep cheerful one's self and maintain cheerfulness among one's associates. I hoped that by this time we might begin to look for ice openings, and seals and walruses, but we are having such very cold weather that everything is shut up tight. I even hoped that we might begin to see a glimpse of an occasional feather, but no bird with a well-regulated mind would trust himself in this temperature. We cannot yet feel the want of fresh food, for our stock of seals laid in in the fall has enabled us to have roast seal every Sunday for dinner, and we have one left now for our coming Sunday's repast. We have also roast bear one day in the week, and that is a treat. Our dogs are hardly as well off as ourselves; they are now feeding on the compressed food, which is steamed until it makes a kind of soup hash. This is not as nutritious as fish for them, and does not satisfy their appetites. They are perpetually rummaging around among the empty meat-cans, and picking up what few, very few scraps are thrown over the side. We need a spell of open water and a chance to get some seals, or a walrus, to give them good food and plenty of it.

February 27th, Friday. — The pumping goes on with its accustomed regularity, the steady thump, thump, of the deck-pump being relieved occasionally by the whirr, whirr of the steam-cutter's engine working the main engine bilge-pump. So far as human ingenuity can be of avail, we have reduced the greatest amount of work to the least expenditure of fuel, and we can do nothing more than wait for the mild weather which will surely come by and by, and when we are afloat

again look around us and see what can be done. To make conjectures, or lay plans at this early date, would be idle. Everything will depend on the extent of the leak when the ship becomes entirely water borne, our ability to keep her free, and the amount of fuel remain-



Watching for Seals.

ing on hand. We have all the resolution to push on to the highest latitude that we had upon leaving home, and we can do nothing but wait for time to show whether our ability can be made to keep pace with our desire.

Beautifully pleasant weather. Were it not for the intense cold we should be having weather remarkably enjoyable ; skies almost entirely free from clouds, a few

stratus at sunrise and sunset being the only ones; very light variable airs and calms, brilliant sunlight, and miles of ice. So brilliant is the glare of the sun that it is imprudent to go outside of the ship even, without snow-spectacles; for if the eyes do not become painful while on the ice they are almost sure to become so shortly after coming in-board. We have had so much annoyance from the glasses frosting up and thus becoming useless for seeing purposes, that some of us to-day tried wearing horse hair eye guards. These we found to be excellent beyond comparison. They did not frost up at all, were more pleasant next the skin than glass goggles, although the rims of these latter are covered with velvet, and, curious to relate, I found that my near-sightedness was considerably overcome by them, enabling me to see at greater distances and with more clearness and distinctness than with the naked eye. This is a fact worthy of investigation by an oculist at some future time.

The bright sunlight out-board also reaches us in-board, and with bright and cheering effect. The air ports and deck lights in the cabin being cleaned of their accumulation of ice allow the sunlight to stream in, and cheer and brighten us while the excessive cold keeps us shut up. The cabin has a very dingy look. The smoke of a whole winter from stoves and pipes has colored the white paint work to a decided black, and we are almost tempted to commence scrubbing it before mild weather comes. But as it will turn our dry and comfortable quarters into wet and damp ones for several days, we refrain. Now that daylight makes things visible which lamplight hid, I am finding in my room on the forward and out-board sides accumulations of ice and frost, which the steward breaks up with an

axe and removes with a shovel. It seems odd for a man to dig his room out at the end of winter, and such a fact might lead one to suppose that I had had much discomfort. On the contrary, I have been comfortable to a greater degree than I had any reason to expect under the circumstances.

As our days lengthen the auroral displays become less frequent and less brilliant. It is impossible to assign any particular cause for their appearance, or discover any particular effect following them. They have been brilliant in intensely cold weather, and also in mild weather, and again they have been faint under similar temperature; they have existed in all winds and in calms, at full and change of the moon, when the ice has been breaking up and when it has been motionless; in fine, under all sorts and conditions of circumstances. The only prerequisite is a dry atmosphere. It has been said that these auroras are not seen over the ice. All that I can say about that is, that frequently we could see nothing but ice during displays, although there may have been water somewhere.

February 28th, Saturday. — Pumping as usual, and using the steam-cutter's boiler for distilling when not making steam to run the main engine bilge-pump.

Beautifully clear and pleasant weather. Our dogs lie and bask in the sun's rays, and seem to enjoy it, although their wool is stiff with frost. Their hardihood is immense. Lying right out on the floe night after night, they seem to keep warm enough, and at the same time throw out sufficient heat to thaw a hole under and around them an inch or more in depth. Ash heaps and dirt heaps seem to be especially sought for. Alliances are formed for their enjoyment, and the approach of an outside dog is the signal to clear for action.

A few of the strongest dogs take post on board at the door of the cook-house to intercept any supplies, and be nearest the place of deposit if they are thrown over the rail, and a hungry or inquisitive brother is at once driven away by them.

February 29th, Sunday. — At eleven A. M. I inspected the ship. Although the berth deck and deck-house were damp, they were at all events clean. The deck-house, having been relieved of some of the boxes of provisions by stowing them in the coal bunkers, presented more room for free circulation; and although the deck was damp, particularly in the wake of the Baxter boiler on the port side and the stove on the starboard side, the temperature being kept at quite a comfortable point rendered it considerable of a shelter in this inclement weather. In all the drip and dampness on the berth deck we have been able to keep the bedding dry, and there has been no instance of bed clothing freezing to the side as I have read of in some other expeditions. The men are bright and cheerful, surveying with much complacency and evident gratification the pumping of the ship by steam instead of hand power. Our Chinese cook and steward are as impassible and impenetrable in this cold weather as if we were enjoying a tropical spring. Seemingly emotionless, all weathers, all circumstances, are alike to them. Living by themselves in the cook-house, they hold no communion with their fellow-men, but are nevertheless cheerful and contented with each other's society, singing songs or playing cards in the evening, day after day, with no concern for the future and no care for the past. Our two natives, Alexey and Aneguin, thrive wonderfully well. Occasionally they "think plenty" about St. Michael's, being a little homesick, but generally they are bright and

happy. They have learned considerable English (and always manage very cleverly to express their meanings), play bean poker, are as fat as partridges, and are longing for the breaking up of the ice and a chance at the walrus and seal.

They are naturally and intuitively the most polite men I have met outside of cultivated society, and would even compare favorably with some of the choicest within it in that respect. Upon meeting an officer first in the morning, a touch of the cap and a good-morning are immediately tendered. If you do or say anything for them that they see or hear, "Thank you" is immediately your reply. If you thank them, "You are welcome" is ready. And all this in a manly, straightforward way, without any cringing or eye serving. A quiet dignity pervades everything in their intercourse with their shipmates.

March 1st, Monday. — The pumping proceeded as usual until 10.30 P. M., when Melville came to me and reported that the Baxter boiler had broken down, the crown sheet having come down by heat and pressure. This of course necessitated the renewal of hand pumping while repairs were being made. I was surprised to find how easily the bilge-pump got the water down and kept it down by pumping by hand ten minutes and resting five minutes. I am of the opinion that so much ice has got under the ship by direct freezing, and the shoving under of floes, as to prevent the entrance of a very large amount of water by lowering the water head. Of course, when we are water borne again this will be proven or disproven, but it can hardly be supposed that the leak has diminished by the closing up of any wound. We might dispense altogether with steam pumping, so far as our ability to keep the ship free is concerned;

but though this might be practicable for a week or two, it cannot be entertained where months have to be taken into consideration.

Our mercurial thermometer is graduated to minus 49° ; but as mercury freezes, or is said to freeze, at minus 39° , it is questionable whether its readings below minus 39° are reliable. At all events, as its reading, hour for hour, is lower than a spirit thermometer placed alongside it, its reading is logged as a nearer approach to the correct temperature so long as it is at or above minus 49° . Below this point it suddenly contracts and falls into the bulb, and there I presume freezes solid. After that moment the spirit thermometers are perforce read and logged. To-day, at the beginning, when the mercury read minus 49° , the spirit thermometer read minus 47° . At one A. M. the spirit thermometer read minus 48.5° , and soon after falling to minus 50° it finally reached minus 53.5° . Before leaving New York, at Collins' request, I directed Green to make thermometers with bulbs of the prismatic colors, but, unfortunately, in transportation to San Francisco, four of the seven were broken, leaving us only red, violet, and black. The object of these thermometers (filled with uncolored spirit) was to determine the effect of the sun's rays acting through prismatic colored bulbs, and so obtain a scale of absorption. One of these (the violet) was exposed to the air to-day, and when our ordinary spirit thermometer read at midnight minus 53° , this violet bulb read minus 47.5° . As this one has agreed very well with our standard mercurial at readings above minus 49° , it is possible that its present reading is nearer the correct temperature than that of the ordinary spirit.

During the last few days I observed that on the port

quarter the snow had melted on the side, and that at noon the frost in the seams was oozing out and trickling down. In order to determine how much of this was due to radiating heat from the ship (the cabin stove being abreast of the quarter), and how much to the action of the sun's rays on the black side, I caused Mr. Collins to blacken the bulb of a spirit thermometer, and this evening it was attached to the ship's side. By experiments made at noon and midnight, I may be able to determine how much heat there is received from the sun's rays.

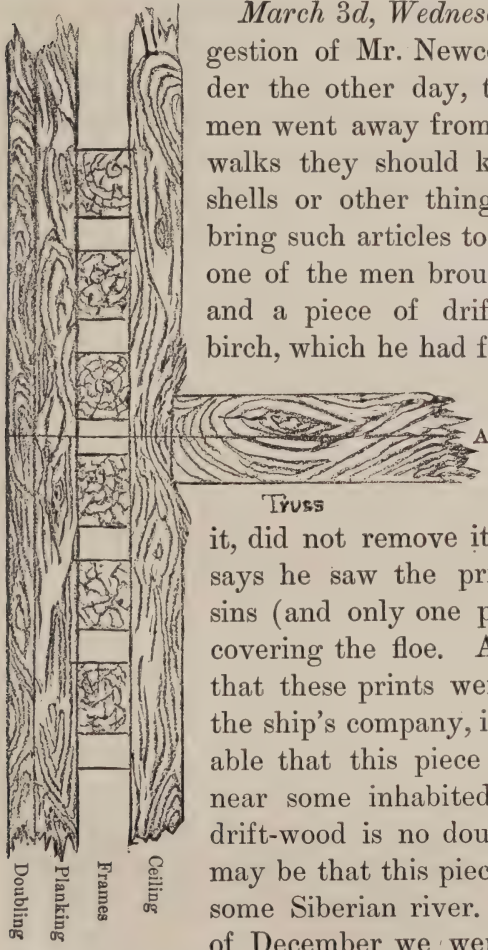
Danenhower had the sixth operation on his eye to-day that it has been necessary to perform. The knife and probe are regular things in his case now, and come at regularly shortening intervals. There is no sign of improvement. Day after day it is the same old story. He bears his confinement and the pain of the operations heroically, and his general health and spirits keep up well. But he will never be of any use to the expedition, and I seriously fear can never be of very much use to himself. If he does not speedily reach a place where his surroundings will be more advantageous to his general condition he may have trouble with his right eye.

March 2d, Tuesday. — The usual monthly examination of the officers and men by the surgeon was continued and completed, and his report handed in. Our condition, upon the whole, is satisfactory. The surgeon says, "I consider that the crew have stood the hardships incident to a winter in these latitudes very well; there has been no case of serious disease among us up to this time that could be referred for its origin to our sojourn in the Arctic regions." Of the eight officers, the condition of one is excellent, of six good, and of one

fair. Of the twenty-three men and two natives, the condition of twenty is excellent, and of the remaining five good. The only serious case is that of Mr. Danenhower, which drags along from day to day. Another operation was performed on his eye to-day, and no doubt others will be necessary at short intervals.

March 3d, Wednesday. — At the suggestion of Mr. Newcomb I gave an order the other day, that whenever the men went away from the ship on their walks they should keep a lookout for shells or other things on the ice, and bring such articles to the ship. To-day one of the men brought in some shells, and a piece of drift-wood resembling birch, which he had found.

It seems he saw this piece of wood in December, but attaching no importance to it, did not remove it. At that time he says he saw the print of two moccasins (and only one print) on the snow covering the floe. As it is not possible that these prints were made by any of the ship's company, it would seem probable that this piece of ice came from near some inhabited land; and as the drift-wood is no doubt from Siberia, it may be that this piece of ice came from some Siberian river. As in the month of December we were drifting around



Sketch by Engineer Melville, showing the manner in which the ceiling was crushed by the strain brought on the thwart-ship thrust during ice pressures. The fibre was broken and crushed to a depth of three-quarters of an inch on each side. Water line at A

in the neighborhood of $72^{\circ} 30'$, that floe, with its wood and foot-prints, must have come a long distance.

March 4th, Thursday. — Being able to begin to see the condition of things in the coal bunkers, Melville made an unpleasant discovery to-day which he reported to me. I immediately repaired to the port coal bunker, and there, to my unpleasant surprise, saw that the heavy six inch Oregon pine strengthening planks were crushed in the wake of the heavy thwart-ship thrust beam to the depth of half an inch, while the metal bolts forward and abaft of this beam were here and there three eighths of an inch from the planks. In some one of our heavy nips this heavy transverse beam has been literally driven into the side. As in this part of the ship there were new frames and new planking, as well as the extra interior strengthening and the outside doubling, she was as strong as wood and metal could make her. Had I any doubt of it before I should be convinced of it now, that nothing of wood and metal could be constructed to withstand the tremendous pressure caused by moving ice-floes. What the condition of our starboard side may be I do not know, for it cannot be seen by reason of intervening coal. It would be idle to hazard a guess as to what this will cause when the ship is again water borne, so we can only wait and see. Clear and pleasant weather.

March 6th, Saturday. — Pumps going as usual. The water seems to be coming into the ship at about the same rate, no change apparently having taken place for some time in the condition of the ice under the ship. Looked at on the starboard side the ship seems to be completely iced up, or in; her rail and the surface of the ice being on the same level. This is caused by her heel of 3° to starboard, and the fact that we have

been for a long time manufacturing ice. At the beginning of the leak the water was pumped out directly upon the floe, where it of course almost immediately froze. As the ice rose in consequence it soon reached our scupper, and that commenced to freeze up also. Then Chipp set to work and had a hole dug out under the scupper through to the water, and by covering over this hole with boards and snow, secured an outlet for the water from the ship, which was protected from freezing. Since this time we have had no trouble. Should we have a commotion in the ice there is every chance of the ice making a sweep of our deck athwartships, but we have to run that risk. No tools could stand the racket in this temperature, and we must wait for an increase of temperature to enable us to carry out the plan of digging the ship out by cutting a trench four feet in width all around her. Ship's position determined by Chipp's observations to-day to be in latitude $72^{\circ} 12' N.$, and longitude $175^{\circ} 30' W.$, showing a drift of twelve miles due W. since last observations, one week ago.

March 7th, Sunday. — At eleven the Articles of War were read, and the crew mustered, after which I read divine service in the cabin. Cloudy and dull weather. We have had such a continuance of bright, clear, and almost cloudless weather that we resent a change. We are also having a moderate gale, another novelty, and are so spoiled in consequence as to be somewhat disgusted. The temperature, however, increases from minus 33° to minus 22° by noon, and falls only to minus 28° at midnight. S. E. winds have always raised our temperature. The ice has opened in consequence, for much vapor was observed to arise from it to-day.

March 9th, Tuesday. — Taking advantage of the

rising temperature we set to work and dug a trench four feet in width all along the port side, until we uncovered the top of the doubling. This was a heavy labor, bringing in picks, axes, and shovels; but it relieved us of the clinging and holding down effect of this amount of ice whenever the ship should struggle to rise and free herself. When we commence on the starboard side, however, it will be a heavier job, for the ship's rail is almost flush with the ice on that side. Should we retain our present position a month longer, we can fill, or nearly fill, this trench with ashes, and perhaps thaw a small basin or dock in which we can float some time before the surrounding ice breaks up and liberates us. The digging to-day brought up a rare stock of empty cans, which, slowly accumulating since November 28th, had as slowly been covered over by dirt, ashes, and frozen slops. Openings occurred in the ice during the afternoon about a mile to the E. and S. E. of the ship, from which large clouds of vapor arose. The time of new moon being at hand, I stood by for a possible emergency, but beyond a slight shock at midnight nothing occurred. The hunters report having seen seals in the ice openings, but brought none back as the result. A skeleton of a baby seal (picked by foxes no doubt) was found and brought to the ship.

A very curious cirro-cumulus cloud, in shape resembling a cornucopia, arose in the S. W. this afternoon, and slowly mounted toward the zenith. It so much resembled a cloud I once saw in the River Plate, immediately preceding a heavy pampero, that I somewhat anticipated a heavy blow in this case, but nothing occurred. As an experiment, I had, some time since, a quantity of salt beef hung up in the rigging, and another quantity packed in snow in a barrel. After

several weeks' exposure we tried each kind, and were inclined to favor the snow-cured as being the more freshened by the operation.

March 10th, Wednesday. — A long lead of open water is seen about one and a half miles to southward, running in a curve from E. to S. W. Vapor rises from this opening during the afternoon until five o'clock, when ice having formed over it, the escape of the heat from the water is prevented and the vapor ceases. As long as daylight lasted the place of the opening lay like a black band stretched out on the white surface of the ice-field. By to-morrow, no doubt, the salt will have become squeezed to the surface, covering it entirely, and making its appearance more like that of the surrounding floe.

Beginning with the first flush of dawn at three A. M., and ending with the disappearance of twilight at nine P. M., our days are beginning to be very long. At six A. M. the anemometer can be read without artificial light. Whenever at night there is no aurora, we can see a faint gleam of light on the northern horizon at midnight, and thus trace the entire circuit of the sun.

The crew were engaged to-day in digging the trench along the starboard side of the ship. This was a much harder job than digging on the port side, because, on account of the heel of the ship to starboard, a greater depth had to be reached to get to the doubling. The deeper the digging the harder seemed the ice, and, finally, it was so hard and so closely knit together as to resemble flint. The freezing has been so uniform as to leave no pores or interstices, and pick-axes have nothing like the expected effect. Six hours' steady digging and shoveling gave about the distance from the quarter to the mainmast. Another day will be re-

quired to finish the starboard trench, and then we can dig out the stem and finally the bow. The ice has regularly taken the exact shape of the ship, and so closely has it adhered to her that in many places the fibre of the elm doubling is imprinted on the surrounding mass.

The hunters were out again visiting the water lane, and Alexey succeeded in killing a seal and bringing it to the ship. This adds to our larder, for as we have had seal every Sunday for dinner all winter, we had brought down our stock to one half of one seal. These seals, and the almost weekly ration of bear meat, have given us a certain amount of fresh provisions regularly, and have gone far towards keeping us in good health.

March 11th, Thursday. — The open water reported yesterday remained closed over until this afternoon, when it reopened. Nindemann reports having seen a walrus with a young one on the ice. He says the young one was fourteen days old. A bear-track was also seen on the trail of the walking parties of yesterday. Ice openings from S. S. E. and S. W. two miles distant from the ship, and much vapor rising therefrom. The temperature began at minus 27° , and fell to minus 33.5° by seven A. M., and then gradually rose to minus 21° by six P. M. The next hour caused a sudden jump of 6° , and the next of $4\frac{1}{2}^{\circ}$, the temperature at eight P. M. being minus 10.5° for the first time since January 12th. At midnight it had only fallen to minus 14° . The air seemed deliciously mild at this temperature; after our experience of minus forties and minus fifties so lately, we are not prepared for such a pleasant treat as the present. An immediate consequence has been a thawing of the ice on the bulkhead of my room, and no doubt a continuance of mild weather will occasion a general thaw within the ship.

March 12th, Friday. — “ Pump, pump, pump with care,” etc. The weather to-day is overcast, cloudy, and gloomy. Accustomed as we are to bright, pleasant days, the occasional advent of a cloudy one makes us feel the difference keenly. But we have had to-day such a novel experience of mild weather that we have fairly reveled in it. The day began with a temperature of minus 14° , and by noon had risen to minus 1° ; and although it got down to minus 7° by nine P. M., it rose again to minus 4° by midnight. Heavy clothing seemed a burden, and fires almost absurd. Had the sun been out it would have made the day perfect. Our men digging under the stern worked barehanded and in their shirt sleeves. I kept my air-port open all day and part of the evening, and in fact made a regular “spring opening” of it. The travelers coming back to-day report having seen a track resembling a wolf’s, and they bring in a piece of snow-covered ice, bearing the impression. It is pronounced by our experts a track of a veritable wolf. About three miles to the southward Alexey says he came across a bit of open water so wide that he could not see to the other side of it.

March 13th, Saturday. — Pumping and distilling as usual, and I suppose such will be the daily record in my journal until the pennant comes down and the ship is placed out of commission. Sounded at noon in thirty-one and a half fathoms, a S. W. drift indicated by the lead line. Ice formed over sounding hole only two inches since yesterday. This is the best evidence we have had of the effect of the present mild temperature. The weather to-day is rather gloomy again. The sky is overcast, and very fine, and light snow falls until seven P. M. It can hardly be called a snow fall, for nothing comes of it. So light is it that as fast as it

falls it is absorbed by the mixture of salt and ice that rest on the surface of the floe, and is lost to us, that is, we cannot hope for any of it to melt and use for drinking water, to let up on our distilling. The high temperature, minus 1° until noon, and even as high as 0.3° at two P. M., and the falling snow, make the floe ice quite soft and soggy, and leave us with damp feet after our hour's walking. This softness is only superficial, however, for our men digging away under the stern find the ice of the hardness of flint. I never dreamed that ice could freeze so hard. But it is proof enough to see pick-axes wielded by strong men breaking off small pieces the size of one's hand, instead of good sized lumps. The mass of ice seems absolutely without pores (though, of course, since the atoms of salt caught up in it cannot be destroyed or eliminated, they must be held in minute cells), and clings to the ship's shape as if it formed a part of her. Except by the pick-axe chipping off and gouging and scoring the wood, the ice cannot be removed next to the ship's skin. So much of the stern post as has been uncovered seems to be all right, and we can but hope that we will find it all right in the future.

The temperature having risen sufficiently to keep our liquid compass unfrozen, the azimuth is taken out to-day, and the ship's head is found to be south 39° W. (magnetic). Chipp also determines our position by meridian altitude of the sun and a time sight of the moon to be lat. $72^{\circ} 31' N.$, and long. $177^{\circ} 58' W.$, almost exactly our position on December 2d, supposing our chronometers have not altered their errors and rates. The drift since the 6th inst., our preceding observation, is thirty-three miles N., 55° W., and as that is a larger amount than we have had in a long time, I

will here record the attending circumstances of the past week's weather, etc., for future consideration of its effect on the drift: —

Date.	Soundings.	Drift.	Amount.	Wind at time.	Velocity.
March 7, Sunday.	31 fathoms.	E.	Moderate.	S. E.	16
March 8, Monday.	31 fathoms.	W.	Moderate.	E.	13
March 9, Tuesday.	31 fathoms.	—	—	Calm.	0
March 10, Wednesday.	30½ fathoms.	W.	—	N.	2
March 11, Thursday.	30 fathoms.	W.	—	—	3
March 12, Friday.	33 fathoms.	N.	Rapid.	S. E.	17
March 13, Saturday.	31½ fathoms.	S. W.	Moderate.	N. E.	7

March 14th, Sunday. — At eleven A. M. inspected the ship. The berth deck was in a fair condition with respect to drip, the rubber blankets being a necessity, of course, over the forward and after berths. Considering, however, all our surroundings, and the unavoidable dampness arising from the steady flowing of water into the fore peak, I must be satisfied. The deck-house, however, was wringing wet. The high temperature of the past few days and the heat arising from the Baxter boiler and stove have caused the accumulation of frost on the sides and roof to melt and run down in streams. The deck was one large slop. So much provisions, etc., are stowed in the house that squilgeeing the deck dry is impossible. Little rivers and rivulets stream out under boxes and barrels. Not having been able to get a winter harbor and get superfluous articles on shore, I have not been able to put this deck-house to its proper and intended use: a living place for the men. On the contrary, it has been nothing but a store-house and workshop.

The ward-room remains dry and comfortable. The cabin has responded to the rise in temperature by thawing the accumulations of ice back of the lockers,

and pouring little streams across the deck. As the ship heels 3° to starboard, these little streams run down hill and collect in little puddles on the starboard side, where they are dried up. The ice and frost back of my desk and book-shelves thaw and run down the curved poop to the bulwark, and thence to the deck, where the steward wipes them up as liquid when he can, or breaks them up with an axe and removes them with a shovel otherwise. And yet the ship's company, as a whole, are healthy, happy, and contented. The individual exceptions are Danenhower and Dunbar. Danenhower's case drags its weary length along, some days better some days worse, although the operations on his eye have not been necessary of late. Dunbar is yet weak and feeble, and seems like an old man.

At one P. M. read divine service in the cabin.

It is, perhaps, worthy of record here that since October 1st we have used but eighteen tons of coal for heating the entire ship and for cooking, and, also, sometimes distilling, and that since January 19th it has required eighteen tons to pump the water out of the ship. The comfort of this latter part is, that whereas we used 11,000 pounds, nearly five tons, to do our pumping the first week of the leak, we are doing the work with 1,845 pounds now, thanks to Melville's skill and devotion to duty.

We have been able to enjoy a rare treat within the last few days. By some miscalculation, I bought so many potatoes the day we left San Francisco that we were unable to eat them all up to the time they froze solid. As cold weather approached, last fall, we stowed them in a coal bunker, and ate them until, by reason of frost, they became insipid and tasteless. In clearing up the other day, we came across a bag which had by

chance remained on deck all winter exposed, save for the protection of the tent awning, to all the rigor of this climate. As an experiment, one or two were placed in boiling water and thus thawed and cooked. To our surprise they tasted like almost fresh potatoes. The heart was black and bad, but enough of the outer body remained to be of use. By thawing a few at a time we were able to get a couple of potatoes apiece at two meals this past week. The difficulty about having them regularly and in quantities is that they turn the hot water so quickly into cold water or ice in drawing the frost, that the proper quantity would defeat the object altogether.

The pumping goes on with its accustomed regularity. Two of our men away on the ice to-day report having fired at a bear and hit him, but he managed to escape. There were brought in to-day from the ice at some distance three species bivalves, one univalve, two pieces drift-wood, some stones, and some sponges. The shells can be accounted for, perhaps, by the habit of walruses in digging them up with their tusks and bringing them to the surface.

March 15th, Monday. — The crew were engaged again to-day in digging away the ice under the stern. Having reached a depth of four feet, water commenced to flow up and freeze at the surface. As much of the stern-post as can be seen is in good condition, and no injury can be discovered around the stern and quarters. Sounds of ice in motion to S. E. and E. at four A. M. Bright, clear, and pleasant weather. The temperature begins at minus 16°, and falls to minus 27.5°.

March 16th, Tuesday. — Sounded at noon in thirty fathoms (muddy bottom). Ice formed five inches in thickness over sounding hole since yesterday. Temper-

ature rises from minus 28° to minus 25° at one P. M., and falls to minus 36° by midnight.

Land was sighted this afternoon bearing S. S. W. (true). It was in the shape of two high mountains, or peaks, with a saddle between them. Supposing the positions in each case to be accurate, the land is the volcano marked by Captain Long as being on Wrangel Land, and distant from us one hundred and ten miles.

The crew were engaged in digging away the ice under the bows, in order to enable us to get at the stem, and perhaps in time at the fore foot, when we can ascertain the extent of our injury. By digging down until the ice becomes fairly thin between the diggers and the water, and letting it freeze thicker below before digging again, we may be able to reach to a good depth.

At six P. M. Alexey and Aneguin, who had been away all day, came back with a bear skin as evidence of having killed a bear. They came across her and her cub about seven miles to the westward of the ship. Alexey's two dogs at once tackled to for fighting, and before the bear was shot she managed with her paws to give one of the dogs a bad wound in the foreleg, and nearly to tear the toes off another. In the *mêlée* the cub escaped. Knowing that it was too late to get the carcass into the ship, the natives skinned it, and then buried the body under ice and snow until to-morrow. This makes a welcome addition to our food for the dogs, and will enable us, I hope, to tide over the present cold snap until mild weather sets in, opens the ice, and lets us bag a few walruses and seals for them. The ice is getting uneasy again, for at four A. M. sounds of movement came from the S. E. and E., following some short, slight shocks the ship had experienced at three.

At one A. M. faint aurora, chiefly in N. E. and W. N. W. Lunar circle. At two A. M. very faint auroral patches. At three, faint auroral glimmer in W. N. W. The sun was raised by refraction above the horizon before six A. M. At eleven A. M. broken curtain arches 10° and 20° in altitude to N. E., extending from E. to N. At twelve the auroral display is thus described by Mr. Collins: "An exceptionally beautiful auroral display commenced shortly before midnight. From W. by S. to N. E., and chiefly south of zenith from 10° to 15° in altitude, an auroral band extended in a series of flat, semi-elliptical curves opening to the northward. On the inner or northward edge of the band it was brilliantly white, while the light faded down towards the southern horizon to a pale, cloud-like intensity, in which faint lines would occasionally show. To the northward of the zenith very meagre bands of long streamers hung across the sky. A peculiarity of the display was the regularity with which the curves (which were moving slowly along the band from W. to E.) broke into rapid and distorted undulations when they arrived at a point lying within the space apparently occupied by the constellation Ursa Major. There the east end of the curve would suddenly deepen and double back sharply, while the aurora would be violently agitated, and would show the prismatic colors with extraordinary vividness. Occasionally, the organization of the original curve would be maintained, notwithstanding the extraordinary rapidity of the movements around its margin; but usually the curve was broken, or seemed to collapse, to be succeeded by forms in the zenith of outline indescribable because of the rapidity of the changes. At times it seemed as if there were two distinct strata of aurora, the lower one being most agitated, so that

the prismatic colors in modified tints crossed and re-crossed each other, while the whole looked like a magnificent pyrotechnic display on which various colors and intense lights were thrown.

“In the W. the band showed occasionally that at a great distance in that direction similar movement was in progress, while to the eastward such a movement was plainly discernible, the rapid changes of the foldings in the band taking the forms of spiral curtains. The whole display, after lasting a half hour, moved to northward of zenith, fading as it went.”

In my remarks on the 14th December, I mentioned our experience in reference to a statement of Weyprecht, that “beginning at a certain thickness the ice is almost free from salt.” Besides testing the ice sixteen inches thick, we have since tested ice four feet thick, and found it full of salt. Evidently we have not reached that “certain thickness.”

In Dr. Kane’s narrative of the De Haven Expedition he makes the following statements: “By the time we had reached the middle of Barrow Strait, and the winter’s midnight of December had darkened around us, our thermometer indicating a mean of 15° and 20° below zero, the ice attained a thickness of three feet, with an almost flinty hardness, and a splintering fracture at right angles to its horizontal plane. Such ice was at its surface completely fresh, and when tested with nitrate of silver gave not the slightest discoloration.” To question such an authority as Dr. Kane is considered to have been is a somewhat rash undertaking for me, but I assert that we have tried all thicknesses of ice, from surface efflorescence to floe pieces eight feet in thickness (which had been up-ended in pressures), and have never found any which would upon melting give potable water. If

his nitrate of silver had any nitrate of silver about it, his test must have been a good one; and the extraordinary, and even marvelous and miraculous, finding of fresh ice (potable water) may be ascribed to the presence of fresh-water ice from the land, which presence can only be accounted for by the equally miraculous floe of melting glacier upon a salt ocean, remaining accommodatingly unruffled until the superimposed fluid had had time to freeze.

Again Dr. Kane says that the floes "which had formed in mid winter at temperatures below minus 30° were still fresh and pure, while the floes of slower growth, or of the early and late portions of the season, were distinctly saline. Indeed, ice which only two months before I had eaten with pleasure, was now so salt that the very snow which covered it was no longer drinkable." In respect to this I can only say that we have tried ice frozen at all temperatures, from zero to minus 30°, and have never had the same satisfactory result. And Dr. Walker, who was with McClintock in the Fox, says (as further and more worthy authority than my statement), "Yet in no case (and my observations extend from below the freezing point to minus 42°) could I obtain fresh water, the purest being of specific gravity 1.005, and affording abundant evidence of the presence of salts, especially chloride of sodium, rendering it unfitted for culinary purposes, much less for photographic use." And he further says: "Perhaps the statement of Dr. Kane that sea-water ice, under certain circumstances, is completely free from salt, may be explained by the following facts and experiments: After our winter preparations had been commenced, and the pool of fresh water (from melting snow) had been frozen over, the men sent out to bring

in snow for culinary purposes brought in some ice instead; this they obtained from some hummock near the ship, these hummocks being part of the formation of the previous winter's pack in which we were caught. The ice turned out to be sufficiently fresh for all the purposes of domestic use. On several occasions the parties sent out for this ice, digging too deep into the hummock, and not content with the surface pieces, found that the ice was no longer fresh, but quite salt — this ice being a continuation of the same hummock, and also of the previous winter's growth."

Now, it is a matter of historical record that the De Haven Expedition had scurvy, De Haven being among the invalids. Weyprecht's party also had scurvy; and later still the English Expedition of 1875 broke down with it. Dr. Kane, with nitrate of silver, could find no salt in ice formed from salt-water; and the surgeon of the *Alert* says he tested the water used with nitrate of silver, and found it perfectly pure. The water used was from refrozen pools of water on the top of a floeberg. Dr. Walker further says: "On the 12th and 13th August, 1857, whilst lying off Browne Islands, and within about four miles of the glacier, surrounded by bergs, I noticed an appearance like oil on the surface of the water. On closer inspection and testing, this proved to be fresh water floating on the surface of the salt to the depth of two or three inches. The sun beaming down upon the bergs had melted the ice and snow; this running off, floated on the surface and remained separate so long as there was no wind to mix and agitate the fluids of different densities. To a combination of such circumstances, with an after-freezing of this surface water, do these fresh hummocks owe their origin. The water, being frozen in this state, and

afterwards the ice elevated into the hummocks, afforded us a 'drinkable element' during the winter; and when the men had exhausted the supply of top-pieces, they supposing that all was alike, continued their labors, but were disappointed in obtaining salt-water ice instead of fresh."

May it not be within the limits of possibility that the men of the De Haven Expedition dug too deep at times, and that brackish water, or at least not potable water, was consumed in sufficient quantities to sow the seeds of scurvy, which, by hard work and exposure in the case of sledge-parties, and dampness and foul air in the case of the ship-keepers, came to maturity?

As if to remove all lingering doubt as to his meaning, Dr. Kane says: "The surface crust bore me readily this evening at a temperature of 21° and 19°, giving no evidence of thaw. Beneath, for two inches, it was crisp and fresh. As I tried it lower, cutting carefully with my bear-knife, it became spongy and brackish. At eight inches remarkably so; and at and below twelve, salt-water paste. On the other hand, all my observations, and I have made a great many, prove to me that cold, if intense enough, will, by its unaided action, independent of percolation, solar heat, depending position, or even depth of ice, produce from salt water a fresh, pure, and drinkable element." We have conducted many experiments with no such experience to record. And in order that I may have it in a succinct and comprehensive shape, I have requested Dr. Ambler to make me an official report on the whole subject, which will make up our version of the fresh water question. (See Appendix F.)

March 17th, Wednesday. — The crew were engaged again to-day in digging away the ice under the bows.

We have now got down to the eight foot mark, and have such a thin layer of ice between the hole and the water that digging has to cease. If we let the water through it will flow up and freeze, and we shall have a mess again up to the original level; but if we let the freezing go on downward for some time we may be able to dig deeper. In connection with this freezing downward, it is a subject of inquiry as to what depth this freezing can take place. We have not seen any single floe of greater thickness than seven feet, ten inches, and I suppose that eight feet may be assumed as the maximum thickness of floe ice by direct freezing, as stated by Dr. Kane. Dr. Walker says that the floe ice in which the Fox drifted had only five feet of thickness. The floe which we saw and measured as having seven feet ten inches thickness was a portion of floe hove up in the great pressures in November; but whether it was direct freezing, or a series of two or more floes overlying each other, I cannot say. When we floated out to open water on November 28th, I commenced the regular measurement of the ice as it froze by measuring in the fire-hole. The last measurement made was on the 17th January, when the direct freezing was forty-six inches since November 28th. This was a piece of ice formed around us, and which had been up-ended in pressure. Measurements in the fire-hole had become unsatisfactory, because of the tendency of the ice to assume the sides of an inverted funnel, and lead to grave doubts as to the position of our measuring-rod. On the 4th March a crack in the floe enabled us to get a thickness of four feet, direct freezing of thirty days, the freezing having commenced when we had a temperature of minus 36.5°, and continued while the highest temperature recorded was

minus 22°, and the lowest minus 53°. So much of the floe in which the ship is held is underrun by other floes, that finding a clear place to bore for a single thickness is like looking for a needle in a hay-stack. I have concluded to wait until a fresh break will enable us to get a correct vertical measurement of the thickness of ice frozen since November 28th. As ice is a non-conductor of heat, it follows that there must be some thickness at which the ice prevents the heat escaping from the water under it, and places a limit to the depth of freezing. At the time the ice was four feet thick the surface floated only four inches above the level of the water.

The bear which Alexey shot yesterday was brought in by him and a dog-team to-day. Nothing could be seen of the cub.

For the first time in the memory of the individuals of this expedition we have seen a 17th of March (St. Patrick's Day) that was not stormy. One of our dogs, an old one, having a comical and quizzical countenance, had long since been named "Paddy," and to-day he was treated to a piece of green ribbon around his neck, and placed alongside of the Baxter engine, a proceeding so unusual as to occasion him considerable astonishment. The dogs in general, and the names given to some of them, merit a special mention, which I shall give them some day. Kasmatka, Tom, Quick-silver, Jack or Prince, Smike, Snoozer, Bismarck, Paddy, Skinny, Foxy, Plug Ugly, Dewclaws, Joe and Jim, Johnny Armstrong, Dan, and Wolf.

March 18th, Thursday. — Land was sighted in the afternoon bearing S., — the direction of the north side of Wrangel Land. The sky became streaky and ugly looking, promising some bad weather. The wind commenced to moan through the rigging sharply. By

eleven the wind got to and remained at W., blowing at midnight with a velocity of ten miles per hour. At midnight lunar halo 4° in diameter, showing prismatic colors. Strong light reflected from the floe while under the moon.

March 19th, Friday. — A day without any extraordinary occurrence, except that at five P. M., local time, the sun crossed the line coming N., and had as an accompaniment all day a brisk N. N. W. wind, overcast and cloudy about one half the time. Much snow dust driven in the air by the gusts. If it were not for one or two snow storms last fall (which, however, did not amount to much) we should not have known what snow was from our experience here. Much of the snow dust now blowing about is from the efflorescence of the floe. At seven and eight A. M. five sun dogs in the sky. At midnight lunar halo, showing faint prismatic colors.

March 20th, Saturday. — Weather clear and pleasant. To my great satisfaction, as insuring a certain amount of food for the dogs, Alexey shot an immense walrus to-day. So large was he that thirty of the dogs and four men could not drag him in over the rough ice, and he was cut in two and one half brought in, leaving the other half until to-morrow. A rough calculation of his weight would give a ton, although Nindemann says he should have put him at 2,800 lbs. It is a fortunate thing that our dogs are not particular as to what they eat, — seal, bear, walrus, condemned meat, fish, slops, all come alike to them. Quantity rather than quality is the great object for their consideration.

Our position to-day by Chipp's observations of the sun is in latitude $72^{\circ} 22' 30''$ N., and longitude $177^{\circ} 27' 03''$ W., showing a drift since the 13th inst. of thirteen miles to the S. 49° E. Until the temperature and the sun's

altitude make it possible to take the daily observations to some purpose, it will be difficult to connect any particular drift with any particular wind. I am quite convinced that during the past winter our drifting has been entirely caused by the winds and not by any current.

March 21st, Sunday. — Pumping and distilling as usual. At eleven A. M. I inspected the ship. The dampness on the berth deck has been somewhat better during the past week. We have been fortunate in keeping the beds dry even at the worst, and but few of the blankets even have got damp. Thanks to rubber blankets, and the system of overhauling and turning up the bedding every morning, the berths have been kept fairly dry and comfortable. Having abolished the fire in the deck-house, except on washing days (Mondays), we save some drip and wet in that place, and also diminish our coal expenditure daily to fifty pounds.

The fire in the ward-room has only been lighted once a week heretofore (Saturday nights, to heat water for bathing), but it made things so uncomfortable for Danenhower (our steady sick man) that for the last two Saturdays it has been discontinued and will not be resumed. All winter the officers have been sleeping at temperatures at and below 32° , and are none the worse for it, seemingly preferring it. The great advantage of it has been the perfect dryness which prevailed there at all times.

At one P. M. read divine service in the cabin. From eight P. M. to midnight we had a fall of soft snow. The temperature, which began at minus 26° , rose to minus 5.5° , making the air feel quite mild and pleasant. The ice was in motion again to the N. E. at four A. M.

The men and dogs went out again this morning and

brought in the remaining half of the walrus shot yesterday, and by great good luck Alexey shot another one, and secured him ready for dragging in to-morrow. This sets us at ease for dog food, for we have now two walruses and one bear as a stock on hand. The last bear killed (a nursing she-bear) does not seem in good condition for our eating, and we shall turn her over to the dogs.

March 23d, Tuesday. — The crew were engaged in digging away the ice under the bows. We got down to a point on the stem where the draught would be six and one half feet, and not caring to dig any deeper, lest we should break through the remaining ice and admit the water, the digging was discontinued. At that depth no injury could be detected, although diligent search was made. The whole bow was dug out to that depth, as far aft as the line of the bulkhead which we built across the fore peak, and not a sign of an injury could be found. I am more than ever of the opinion that our forefoot is the seat of the damage. At midnight, however, all our labor was in one sense lost, for the pressure of the water underneath was too much for the thin layer of remaining ice, and holes were broken through sufficient to flood the large pit under the bow.

The only thing worthy of note to-day was a parhelion at noon, consisting of a circle of faint prismatic colors and 35° in diameter around the sun, with a mock sun on either side, and an inverted arch 2° above it showing strong prismatic colors. Our days are lengthening in the most comfortable manner, although the temperature still keeps low. Broad daylight until 7.30 P. M. is something worth having. A light is needed to read the instruments at eight P. M., and for that only, for there is light enough for all other practical purposes.

It is not so very long ago as it seems to me when I recorded it as something noteworthy that we could read the anemometer at noon without a lantern. In fact, there are some among us who claim to be able to see it even at midnight when there is no moon.

By this morning the water was at the height of ten feet ten inches on the stem, and had there reached its level. I do not think the ship would draw that amount of water were she free to float, for she is no doubt firmly held by the mass of ice which formed around her since our coming here on the 25th November, at which time her draught of water was nearly eleven feet forward. When she does get free I think she will draw much less forward, because we have been steadily lightening her by consumption of coal and by moving so many weights aft. Additional lightening forward will be attempted when mild weather comes, by trimming all the coal and getting more provisions aft, my object being to get the water level below the line of the berth deck. This we can do with a draught of nine feet, and then we can shut the bulkhead across the fore peak and manage to carry the fore peak full of water without danger, stopping our steam pumping and saving coal.

We went to work again to-day digging away the ice under the stern, so as to get the propeller frame and perhaps one blade clear. Land was seen in the afternoon bearing S., — the same two peaks with a saddle between them which we have seen before, and suppose to be the N. side of Wrangel Land.

March 25th, Thursday. — Weather clear and pleasant until ten A. M., the wind prevailing from W. S. W. From ten A. M. to ten P. M. the sky was overcast, and from noon till six P. M. a thick fog surrounded us. Many openings occurred in the ice between S. E. and S. W.,

indicated by large quantities of escaping vapor, succeeded by a water-sky. I am inclined to think that much if not all of the water-skies we read about during winter, spring, and fall, instead of indicating water spaces at that moment indicate where open water has been. For, when openings occur at a time at which the temperature of the air is below that of the uncovered water, such masses of vapor are given off that the air is filled with them in their immediate locality. When the young ice forms on the surface, the escape of vapor ceases. The color of the new ice is dark green or dark blue until the efflorescence occurs, and it is this dark space reflected in the sky as in a mirror (in broad contrast to the dead whiteness of the reflected ice-field) that gives rise to the reports of extraordinary continuance of open water.

In digging away the ice under the stern we succeeded in uncovering the upper part of the propeller frame, and then had to stop lest we should make the remaining layer of ice too thin for the pressure of water from below. No sign of any damage was apparent.

We are extremely fortunate in lying here so long without having serious disturbance. Since the 19th of January, when we were injured, we have had no serious conflict with our enemy. Every new and full moon, however, the ice has opened, and the horrible grinding and crashing has gone on, but at such distances from us as to be inoffensive. Almost every day somebody has seen the result of pressures, — great confused masses piled up thirty and forty feet in height. Sharvell came in the other day and said he saw, about five miles northwest of the ship, ice piled up as high as our mast-head. He evidently regards our destruction, by reason of our reaching that mountain of ice, or that mountain of ice

reaching us, as merely a question of time; for he asked Melville the other day why I was having the big walrus skull cleaned and saved, for when the ship was smashed such a big head would be a heavy weight to drag over the ice.

Although the commotions in the ice at a distance have not affected our floe, it has undergone change from another cause. At different times this winter when we have had trouble close aboard, the pressures and upheavals have made our floe humpy and ridgy, in some places confused piles of ice standing five and six feet, and sometimes twenty feet in height. Not only the height but the shape of these piles has changed. At first I supposed it might have been a kind of settling down or coming in closer contact by downward weight and pressure constantly applied to a smoother floe beneath, but now I have become convinced that it is caused by the wind. The steady friction on the exposed surfaces, in part, and the action of driving snow dust and salty efflorescence acting after the manner of a sand-blast have slowly but surely ground the surfaces down. When in high winds the driving of snow and salt from the surface of the floe has made our faces tingle and smart like so many needle pricks, it must have had an appreciable effect on intervening blocks of ice.

Another curious fact, though easily explained, has come under our notice. The ice floats deeper in winter than in summer. To do this its density must be greater, and our experience in ice digging has shown that it has been of the hardness and closeness of flint. When we came into the ice in August and September, we found it to some extent soft and honey-combed, being so rendered by the warmth of the water induced by the heat

of the summer sun, and in consequence it floated higher above the surface.

March 26th, Friday. — Sounded at noon in thirty fathoms, muddy bottom. Strong drift to W. indicated by lead line; so strong was it that Mr. Dunbar had great difficulty in getting an up and down sounding, the lead being swept off the bottom. Ice three inches in thickness formed over sounding hole since noon yesterday. A fresh gale from E. S. E. and E. all day. The temperature began at minus 12.5° , but by ten A. M. had gone up to zero, and after having reached 4.5° , closed the day at 3° . So much heat was startling, and induced us to face the wind for its soft and warm effects.

Clear and pleasant weather until sunrise just before six A. M., when it became overcast and gloomy and remained so. Much fine driving snow fell, and as soon as it had drifted into little ridges, say six inches deep, I scooped up two handfuls of it and had the surgeon test it; but alas! even newly fallen snow had, in being driven across the face of the floe, caught up and carried along too much salt. I shall soon believe that it drops salt from the sky. We also had a thick fog for five or six hours in the middle of the day. Previous thereto the ice opened and clouds of vapor escaped, and then the opening must have been so extensive as to cause the fog.

March 27th, Saturday. — A breezy day. The temperature commenced at 4° , and went up steadily to 13° as the day ended. Much fog between six and ten P. M., proceeding from evidently extensive openings in the ice to the southward and eastward of the ship. By Chipp's observations to-day we are in latitude N. $72^{\circ} 29'$, longitude $178^{\circ} 07' W.$, showing a drift since the 20th inst., of fourteen miles to N. $63^{\circ} W.$ This is prob-

ably the result of the fresh E. and S. E. winds we have had for the past two days. In a few days I shall relieve Chipp of the extra duty of taking sights, and shall make daily observations, when possible, for position to determine the extent and character of our drift, and its connection with the direction and force of the wind.

March 28th, Sunday. — Pumping and distilling as usual. A singular circumstance occurred during the past week in connection with the leak. On Wednesday and Thursday the amount of water coming into the fire-room was about eight times as much as before and since. No greater amount of water seemed to come in forward, but yet it was necessary to keep the steam-cutter's engine going nearly all the time aft. During these two days the forge was lighted in the fire-room, for some machinist's work, and as the heat from it was sent up the smoke-stack we supposed that it might have caused a melting of the ice therein, and thus added to the amount of water in the fire-room bilge. To strengthen this supposition, when the fire was extinguished the water went back to its old condition. But then, to our surprise, the fire-hole, about thirty feet from the mizzen chains, was found closed up, a slab of ice having shoved in under. Now what change could have gone on under the ship to affect the leak? At no time was any sound heard by us in the cabin, the men in the fore-castle, or the watch in the fire-room. The whole thing is a puzzle to us yet.

At midnight a faint dawn light could be seen on the northern horizon. At eleven A. M. I inspected the ship. The berth deck has been somewhat drier during the past week, but the deck-house is and has been in a fearful slop. This is unavoidable, because, however un-

necessary heating may have been, during the past week we have been obliged to keep the Baxter going, to run the forward bilge-pump.

If we only could get down to the leak and tinker at it we might do something. If we could have open water enough we might build a coffer dam and get it under the bow; or if we could get the ship into a harbor and beach her, we would be all right: but these things seem impossible in our present position. The amount of care and anxiety on my mind, trying to plan all things for the best, will last me for my lifetime.

A result of the high temperature to-day was the covering of all the bolt-heads on the outside of the ship with frost. The heat of the sun has long since melted all the snow on our black sides, and the round masses of frost stood out like white bull's-eyes. The metal bolts have been so cold that the coming in contact with a warmer air has condensed and deposited the frost. At one P. M. performed divine service in the cabin. Alexey and Aneguin were out to-day in quest of game, and going about two miles to the S. E. of the ship came to open water, in which they shot a seal. While Aneguin came back for a kyack, Alexey shot three more, but unfortunately he only got one out of the lot. It came in time, for we had eaten the last half of our last seal, and wanted one in readiness for next Sunday's dinner.

March 29th, Monday. — Commenced to-day to break out the forward store-room to clean out the frost and get ready for our permanent stowage. This is going to be a serious affair, for the fore hold and fore peak must be kept empty in case of a sudden increase in the leak, and yet we cannot keep our spar deck filled with provisions as it is now. Our efforts will be directed also to getting as much weight aft as possible to bring her

head up, and we are seemingly filled up chock-a-block now aft. However, Chipp is charged with the more than herculean task of finding room for "more" (when everything is filled up), and I have no fear as to the result. We shall be in a fearfully bad trim for sailing; and as for steaming, it is a thing almost out of consideration except for a few days. A glance at the coal account shows that I anticipate having but sixty-three tons of coal on hand May 1st. Keeping thirty-five tons for use in case we are caught here another winter, leaves us but twenty-eight tons for steaming, pumping, and cooking during the summer. The galley uses $1\frac{1}{2}$ tons per month, and for pumping we need, say, $3\frac{1}{2}$ tons; $28 - 5 \times 4 = 8$ tons for steaming!

March 30th, Tuesday. — By my observations to-day I place the ship in latitude $72^{\circ} 36'$ N., longitude $178^{\circ} 07'$ W., seven miles N. of her position on the 27th inst., and almost identically the same position as occupied on November 30th.

CHAPTER VIII.

UNDER THE MIDNIGHT SUN.

April — May, 1880.

Change of Routine. — Saving Fuel. — Driving a Dog Team. — A New Resource. — Birds. — Dampness and Cold. — Canned Food. — Completion of a Windmill. — Winter Lingerin in the Lap of Spring. — Pemmican. — Wasting of the Ice-Field. — Drift-Wood. — Walrus. — Distant Land. — A Deep Hole. — Sunshine at Midnight. — Target Shooting. — Pure Water. — Bears and Birds. — Gloomy Weather. — Habits of the Dogs. — The Crew's Quarters. — Danenhower's Condition. — The Ice as a Sledge-Road. — Bear Hunts. — The Sick List. — Patience and Dullness. — Discouraging Outlook. — Sledging. — New Leaks. — Looking for Release.

APRIL 1st, *Thursday*. — This month opens with a very pleasant incident. At 8.15 A. M. Ericksen rushed into the cabin announcing, "There is a big bear right under the quarter." Away rushed Chipp, Dunbar, Newcomb, and the doctor, the three former with rifles. Alexey and Nindemann were already on the ice in pursuit of a fine large bear, all the dogs surrounding it, yelping and barking, and driving poor Bruin almost wild with the din. Shooting under these circumstances was almost certain to result in killing a dog, so the bear was enabled to get away about a mile from the ship. The dogs managed him beautifully. While about twenty of them would surround him out of reach of his paws and distract his attention, a half dozen of them would bite him, making the hair fly by mouthfuls. The bear would then throw them off, and, sitting on his

haunches, reach around for them with his fore paws. This movement gave Alexey and Dunbar a choice point for firing, and Alexey put a bullet into him, which dropped him. He got up again and renewed his fight with the dogs, until Dunbar finished him with another bullet. He was a beautiful animal, eight feet in length, three feet five inches in height, and weighed six hundred and seventy-five pounds gross weight. His stomach was perfectly empty. He had got within one hundred yards of the ship, when the dogs sighted him and made him turn.

A change in the routine is made for the spring and summer. When we are moving again some modifications will occur.

April 2d, Friday. — Daily routine, commencing April 1st, 1881: —

- 5.00 A. M. Call ship's cook and cabin steward.
- 5.45 Call executive officer.
- 7.00 Call all hands.
- 7.30 Breakfast by watches.
- 8.30 Turn to; clear up decks; clear fire-hole; get soundings, etc.
- 9.00 Watch below to go hunting.
- 9.30 Clear forecastle; open doors and scuttle for ventilation until 11.30; inspection by executive.
- 11.00 Hoist the recall flag at the fore.
- 12.00 M. Dinner by watches.
- 1.00 P. M. Turn to; watch below to go hunting.
- 5.00 Hoist recall flag at the main.
- 5.30 Supper by watches.
- 6.30 Turn to.
- 8.00 Boatswain and carpenters report the departments.

- 9.00 P. M. Open forecastle doors, and partly open scuttle until morning.
- 10.00 Lights out in forecastle ; noise and smoking to cease.

By this new routine we still have but two cooked meals a day. The tea water for supper is boiled on the fire in the stoves in the cabin and berth deck as heretofore since November 1st. This arrangement will hold good as long as we keep the stoves going. But as I shall stop them as soon as we can safely (not comfortably) do without them, in order to save every lump of coal, some other way of boiling the tea water has to be devised. While Melville and I were talking it over to-night, we thought it would be possible to make a little fire in the observatory stove down in the fire-room each evening, which would boil all the tea water together. But it suddenly flashed into his mind that as we should be pumping by steam as long as the coal lasted we could boil the tea water by steam also. And with him to think being to act, the whole thing is *un fait accompli*. If we can get along with pumping by the Baxter engine alone, we may have a little trouble in thus boiling the water by steam, because the steam-room is so shallow that salt spray is lifted and carried along with the steam, and would mix with our tea water. If we are using the steam-cutter's boiler continuously, there will be no difficulty, for as it has a steam-drum on top of the boiler all danger of lifting salt spray is eliminated. How we may have to use it and the Baxter together, or only one of them, will appear a little later.

We took out the port forward bilge-pump to-day, and put it down the fire-room hatch into the fire-room bilge, cutting a hole on the after side of the hatch coaming on the starboard side for the pump delivery. When it is

secured in place we shall move the Baxter engine and boiler down to the fire-room, and connect them by gearing somewhat similar to that now in use for the pump brake. Then the Baxter and steam-cutter's boiler being side by side, — the one delivering water on the spar deck, the other delivering water through the side, — we shall open the forward floodgates and let all the water come aft into the fire-room. If the Baxter can pump all the water, we shall save the coal now consumed by the steam-cutter's boiler; if the steam-cutter's boiler can do the work, we shall save the coal now used by the Baxter. At all events, if one alone cannot do it, we may light a fire under the steam-cutter's boiler in time to get tea water for supper, and pump with it also, say twelve hours, using the after bilge-pump by hand occasionally, if necessary, and thus save the coal now burned in twelve hours by this little boiler.

I mention these items minutely, to show how carefully we are watching our coal pile and making every pound do its work. I suppose any sensible person will admit that the propriety of pumping by steam is unquestionable. Under ordinary circumstances of a vessel at sea springing a leak, hand pumping for a long period to make a port is to be expected. But here in the Arctic seas, where for more than two months we have been leaking, and when for perhaps two months more we may be fast in the ice, the situation is quite different. Supposing that we had resorted to hand pumping, very probably one half of the ship's company would have been on the sick-list by this time, or if not sick at least worn out; and had any accident crushed the ship and forced us to abandon her, in what condition would the crew have been to march two hundred miles over the ice, dragging heavy sledges, to the nearest settlement?

Having completed the work of cleaning and restowing the forward store-room, we set to work to-day to perform a similar service for the after store-room. Having only the tent awning over the spar deck to protect it, the beams in the store-room, the pumps, and the iron knees made excellent condensers for all moisture formed below in the ward-room, and passing into the store-room through the communicating doorway. The forward bulkhead of Danenhower's and Collins' rooms, though well felted, likewise acted as condensers. Danenhower's room was thoroughly scraped the other day by his careful nurse, Johnson; but Collins' room, being delayed, commenced to thaw on him last night, wetting much of his clothing. The after store-room was one mass of frost on the parts above indicated, the pumps particularly seeming enlarged to twice their ordinary size with ice.

The usual monthly medical examination was commenced to-day by the surgeon. So carefully has this examination been conducted, and so thoroughly is the men's condition known, and so satisfactory is the state of our health (except in Danenhower's case), that upon the doctor's recommendation I decide to suspend the monthly examinations for the present, say for three months, unless some occurrence makes the resumption prudent.

April 3d, Saturday. — Mr. Dunbar, who seems to be regaining his old strength and endurance (although his gait is more like that of an old man than one of his years), took a long tramp with Alexey and Aneguin about seven miles S. E. from the ship. At that point he came to some very heavy ice, seemingly aground, as it had no motion, although with water around it. The extent of water may have been two hundred feet in

length and fifty feet in width, narrowing to cracks at either end. For several days he and I had observed from aloft a long ridge of ice to the southward, and had made conjectures as to its being stranded on a reef or shoal; and since he has gone out there and thinks it looks much like it, he will on Monday make one more trip to sound. He says that while he stood on the floe edge looking at this ridge, everything being still, there commenced a trembling of the ice on which he stood, and a commotion in the water in front of him, when suddenly a large mass of ice as big as the after part of this ship cut off at the poop came up with a bound, and settled to its line of flotation. Being in some unaccountable manner liberated from the power that held it under the floe, it made its way naturally to the surface.

The surgeon's report is rendered to-day. Of the eight officers, the condition of two is excellent, five good, and one fair (considering); of the twenty-three men, the condition of seventeen is excellent, six good; and the condition of the two natives is excellent.

Danenhower's case has no marked improvement. With the confinement he has undergone, and the certain mental anxiety which he no doubt experiences, it is wonderful that scurvy has not selected him as a fair opportunity. As the temperature falls from 6.8° to minus 13.5° we are evidently not done with winter yet.

The familiar grinding and groaning of ice in motion was heard at one A. M. Somehow or other, I cannot help anticipating a considerable disturbance at our next new moon, on the 9th inst. Our sudden drift and recent high temperature indicate a loosening of the ice somewhere, and if we go toward the place we may become mixed with it.

I had almost begun to believe that I knew how to and could manage a dog team, but I have changed my mind. Hitching up eleven dogs to-day to a heavy sled, Melville and I started out on a cruise. We usually have merely to start the team on an old sledge track or foot way, and then, with the judicious use of a long lashed whip, we can ride on the sledge as if it were drawn by horses until the track ends or we wish to return; but to-day we could neither lead nor drive. The dogs would go a few hundred feet from the ship and then bolt, dragging us back to the gangway. If one of us took hold of the leaders, the middle of the team would double back. Whipping on one side would make them vault to the other, and though we occasionally weathered the dogs by getting the sledge caught in a snow bank, or capsizing it, when the curved ends would serve as an anchor, it would be only long enough to give us a breathing spell; for as we had to get the sled free ourselves, the dogs had it all their own way, and tore us back to the ship. Finally, when almost exhausted with our conflict, we had to send a man ahead with the "sick" dog, who is a chum of Jack, our leader, and so contrived to keep his attention occupied while we managed the wheelers and mid-ship dogs. Even then one of the dogs was so averse to going that he would throw himself down, and be literally dragged by the neck and body for a hundred yards or more at a time, refusing to get up though beaten with the whipstock until I was tired. Thus we managed to get a mile away from the ship, and then giving the dogs the charge they rattled us back gayly.

April 4th, Sunday. — At ten A. M. had general muster and read the Articles of War, after which I inspected the ship. The condition of dampness on the berth deck

is somewhat improved during the past week. The deck-house, having been relieved of much of the load of provisions stowed therein, seems like a spacious apartment emptied of its furniture. By the end of this month the house will be for this season, at all events, a thing of the past, for I hope the temperature will have so far comfortably increased that we may remove it entirely. The forward and after store-rooms having been cleaned and restowed are again in good order and condition, though I fear the low temperature we are now experiencing may cause condensation again, and, later on, result in thaw and wet. The ward-room and cabin are as usual dry and comfortable.

April 5th, Monday. — And now one would imagine that we had arrived at the end of our resources for saving coal without resorting to hand power. But it is not so. Some days ago, in thinking matters over, I recollected having seen pumps run by windmills, and upon consulting Melville as to the practicability of making the necessary machinery on board ship I was gratified, but (knowing his genius and unfailing readiness to adapt the means to the end) not surprised, to have him say, "Can do it." He thought out all the details, and has immediately commenced working drawings for the construction of the windmill bilge-pump. He calculates that with a wind of velocity equal to five miles an hour, we can have a mill that will do the work now done by the altered main engine bilge-pump run by the steam-cutter's engine. Of course when we have no wind we must pump by hand if we wish to save coal, but the number of hours of calm in a month has been so small that I think we can safely take the chances for the future.

Sounded at noon in thirty-three fathoms, muddy bot-

tom, a slight easterly drift being indicated by the lead line. A seal has found our sounding place a convenient breathing hole, and comes there so regularly that no ice has been able to form over the centre of it since noon yesterday, but from the centre outward there is ice six inches in thickness in some places. Sunrise at 4.24, sunset at 7.40. Observed to-day for position, determining it to be in latitude $72^{\circ} 30' N.$, longitude $178^{\circ} 33' W.$, showing a drift since the 1st of eleven and a half miles to S. by W. Temperature begins at minus 21° , falls to minus 23.5° by five A. M. This cold snap is very unwelcome, because we have moved the Baxter from the deck-house, and have long since discontinued the deck-house stove, and that edifice is consequently as cold as charity. Looking forward to the future with the experience of the past, I think it is likely that this cold will continue until the new moon on the 9th, after which I hope we shall have quite a moderate spell.

Mr. Dunbar in his wanderings to-day visited the apparently grounded ice again, and saw quite a lane of open water, but nothing to shoot at. From our topsail yard a narrow ribbon of water can be seen running from S. W. around by W. to N. E., and averaging seven miles in distance from us.

April 6th, Tuesday. — For several evenings past, at eleven P. M., I have noticed a long, low streak in the N. W. that very much resembles land. It cannot be seen on our brightest days, because the sun shines against it and hides it in the glare of the ice. But when the sun gets below the horizon and behind it, it comes out with distinctness enough to at least raise the suspicion that it is land. Of course it may be a stratus cloud, but it is somewhat singular that the same shaped cloud should be in the same place every night.

As the sun continues to set later and later we shall ere-long resolve our doubts.

April 7th, Wednesday. — Having finished all our connections with the new pump rig, and all being in readiness, the combination was tried this afternoon. It worked to a charm. The flood-gates were opened, and all the water was allowed to come aft as freely as it pleased. The Baxter then took hold and pumped it out. While waiting for more to come aft, a source of difficulty was discovered which forces us to suspend the rig until milder weather. The discharge is necessarily through a canvas hose leading from the fire-room hatch across the spar deck to a convenient scupper, and so to a hole which was dug in the ditch on the starboard side through to the surface of the water. This hole, of course, had to be covered immediately with a wooden box and a snow-house to protect the water from exposure to the open air and its temperature of minus 20° at times. But we could not keep the canvas hose and the top of the pump from exposure to the air, and consequently, while the pump was necessarily “spelled” to wait for water, ice formed in the canvas hose and choked it up. The flood-gates were again closed, and the water accumulated in the fire-room from time to time was pumped out as before by the steam-cutter’s engine, while the remaining bilge-pump forward was worked by hand as required. This we found to be from five to ten minutes every half hour. The fires under the Baxter were allowed to die out.

Our friend the seal comes still often enough to breathe to keep a hole open in the centre of our sounding hole, and so the ice is prevented from forming with any degree of regularity.

The ice was in motion immediately after sunrise, and

all along in the afternoon until six o'clock. The movement seemed to be confined between N. W. and N. Brilliant parhelion 22° in radius immediately after sunrise, and two brilliant sun dogs at five and six A. M. Although the sun is below the horizon for about eight hours, we have daylight the whole twenty-four hours. That is to say I consider enough daylight existing at midnight to navigate the ship were there open water to make it possible. No regular order of sunrise and sunset can be marked from day to day, the time of these events varying greatly with the refraction. I am scrupulously careful in my observations for position to apply to the mean refraction Chauvenet's corrections for height of barometer and for temperature. At such altitudes the corrections are not very large; but when the sun approaches its setting, for instance, they are so markedly important as to make their omissions a serious error.

April 8th, Thursday. — Our pumping goes on now in this manner: When enough water gets aft into the fire-room to be worth the steam, the little cutter's engine pumps it out. At other times the steam-cutter's boiler distills water. Every time the bell strikes, the man on watch works the forward spar deck bilge-pump until it draws air, which it generally does in from five to ten minutes. Our windmill pump rig gets on apace, Melville being engaged in making necessary forgings, and the carpenters working at such wood-work as is required.

April 9th, Friday. — Our new moon has come, without any of the disturbance I anticipated; not even a jar occurred to note its arrival. The first bird of the year arrived to-day. A raven, flying from the southward, lighted on the ice near the ship long enough to

be plainly visible, and then flew to and disappeared among the rough ice about one hundred yards from us. Mr. Newcomb started after him to add him to the collection, but failed to find him.

April 14th, Wednesday. — To-day our steward went to work clearing out the ice from the tiller-room. This is a new name in my record, and requires explanation. Last fall I had the doors opening from the cabin into the chart-room unhung, and mounted between the propeller well and chart-room bulkheads, completely shutting off the after part of the cabin containing the rudder head and tiller. This shut-out space has acted as a perfect condensing chamber for the cabin, keeping our mess-room dry during the lowest temperature of the winter. I am stating nothing new when I say that all moisture will fly to a cold surface and condense. Shutting off the after part of the cabin has made a cold room into which the moisture has penetrated, through cracks and the key-holes when the doors have been closed, and in volumes through the doorways when the doors have been opened, and ice has formed there from the condensation. Now that milder weather is coming, this must be removed, or else melting, it will run in streams. Of course the condensing chamber has not benefited Chipp's room or mine, for our air ports, forward bulkhead, and the bulwark being exposed outside to the temperature of the air have supplied the cold surfaces nearer at hand for the condensation. The chart-rooms have had some ice, but not much, form on the bulwark and book-shelves against the side, and of course the air ports have been one mass of frost. I am firmly convinced that had our deck-house extended forward to entirely cover the berth deck, the berth deck would

have been dry; and if we had not been obliged to use our Baxter boiler for distilling, and afterwards for pumping, so largely increasing the moisture which was carried to the berth deck as to use up all the cold space presented by the sheet-iron ventilating cover, and air port frames, and demand more, the deck would have been drier than we have found it. As a rule for my future guidance I will say, Provide the coldest surfaces in the desired places, and then the dampness and condensation will be under control. This cold-surface method annoys me in one way, namely, by fogging up the glasses of the roof of the artificial horizon. I have generally placed the horizon on the small table on the floe, but the table, having been moved the other day for some purpose or other, has not been refastened thoroughly enough to keep the mercury still in any wind. I therefore place the horizon trough in the thin snow on the floe, and grind down the roof into the snow to keep out all wind. In a few moments the heat of the sun through the glass next to it raises the temperature within; moisture arises from the warming snow, and immediately flies to the cold surface, first to the glass in the roof away from the sun, and there deposits, becoming a film of ice as soon as the roof is lifted from the snow.

By an accident or carelessness our water supply for the day was spoiled this morning by Boyd, the fireman on watch. Our steam-cutter boiler is fed from the sea always, but on this occasion the feed was taken from the bilge. The result was that the distilled water was so bad in taste as to be nauseating. The water-barrel will need several scourings and cleanings before it loses the bad taste, and for a day or so we must fall back upon snow-water.

Having a large stock of bear meat on hand, I approved Chipp's suggestion to make some of it up into sausage-balls, mincing pork with it and adding powdered herbs. Our St. Michael's salmon were finished yesterday, and I fear we shall find it hard to supply their place. Canned fish cannot be said to be a nourishing or agreeable kind of food. An exception may possibly be made in favor of canned salmon, but that alone. We have a barrel of codfish which Captain Jesperson, of the *Fanny A. Hyde*, caught while becalmed off St. Lawrence Island, and which he salted down; and as the fish is solid it will be a more acceptable food than the rags and small pieces which all canned fish (except salmon) seem to be.

The work of restowing the small holds being completed, our quarter deck is now quite clear. What a comfort it is to see the deck again after so many months can hardly be appreciated by one who has not been circumstanced like ourselves.

April 15th, Thursday. — This morning upon getting up I was informed that a suspicion of land to N. N. W. was occasioned by the peculiar appearance of some clouds in that direction. Upon going on deck I saw what all seafaring people would call clouds hanging over the land, but though we peered anxiously and hopefully with glasses we could see nothing of the supposed land underneath. A strong corroboration of the suspicion occurred in the sight of two snow-buntings, which flew towards the ship from the southward, and after a moment's rest on the ice flew toward this suspected discovery. They might have remained near the ship, but as soon as they alighted on the ice under our flying jib-boom the lean dog Wolf, always ready for a mouthful, rushed for them and drove them away.

Once more are my eyes gladdened by seeing the yellow top of the poop. We went to work to-day and removed the thick coat of snow which has made it seem all winter like the effect of an avalanche, and the change is more than pleasing. The large amount of dirt, ashes, empty cans, etc., which was alongside the ship to port, was also removed to-day, a faint, disagreeable odor arising from it, warning me how objectionable it might become a month from now. We are slowly but surely cleaning up, and becoming more like a ship than a frozen habitation.

Our bear sausage-balls were tried at breakfast to-day and pronounced good, though hardly seasoned enough. That is a fault easily remedied, however.

Sounded at noon in thirty-three fathoms, a drift to the N. W. being indicated by the lead line. The seal kept a breathing hole open, but three and a half inches of ice formed outside of it.

April 16th, Friday. — We find that removing the snow from the poop, thus uncovering the yellow-painted canvas, presents a surface which attracts and absorbs the heat of the sun's rays, and by radiation upward affects the readings of our thermometers. Accordingly (though the uncertainty of the ice makes their situation risky) the box containing them is removed to the floe, and secured against two upright stakes driven in the ice. The black bulb in vacuo is also removed, and the anemometer will follow. I shall hope now that no sudden smash-up of the ice will involve a loss. I concluded to-day to move out the secretary bureau in my room, and clear out the accumulation of ice from behind it. The drawers had long since become so swollen from the dampness as not to stir; and though I had the carpenter plane them down considerably, they





A circumpolar



*showing the highest points
reached by different navigators.*

From the latest authorities

1855.

pleased to swell up again so much and so quickly that I yielded the point and did not use my bureau again. After a hard fight to-day I got the bureau to move. So much ice had formed between its end and the forward bulkhead and its back and the bulwark that it was frozen as one solid mass. I do not think I exaggerate a bit when I say that over sixty pounds of ice were removed. I took out one slab which weighed about twenty-five pounds; and there were in addition two buckets full of small lumps and scraps picked up with a shovel. The paint work of my room, which had become a fine specimen of black color, was cleaned partially by the steward, and the contrast of clean white to beautifully dirty black is so glaring as to be almost painful to my eyes. The frost in the lower drawer of my bureau had taken full charge, making it necessary for me to work with a hammer and break the ice before I could get a pair of pantaloons out. However, I have suffered no inconvenience during the winter, and by a little work now I have anticipated a thaw.

The walrus meat and the sucking mother bear, condemned for dog food, were some time since removed to the floe from the house-top, and piled up alongside of a whole walrus now lying there. This food is constantly watched by the dogs, who change parties but never relax in vigilance, lest by some mishap the dead animals might get up and walk away. It took them some little time to get accustomed to the order forbidding them to come on board ship at all, since mild weather has set in, and we have cleaned up our quarter-deck; and they would line the gang-plank regularly every evening, like chickens waiting to go to roost. Since they have been feeding on walrus and bear meat they have grown as fat as dumplings, and as lazy as

human beings in the tropics, and they are so averse to work that a sight of harness will make the whole pack skulk off.

Though the highest temperature to-day was only plus 12°, the black bulb in vacuo gave its highest reading at 103°. (If the ice in which we are so firmly held were only black, how quickly would it melt in a vacuum!) The black bulb in the sunlight and air gave plus 30° as its maximum reading.

April 17th, Saturday. — We commenced the day by removing three thermometers from the box on the floe, and substituting three others; in case of any accident I do not want to lose those which we have read and recorded all winter. Our standard, 4.313, is left in the box for continuous record. During the day the anemometer was also removed to the ice, so that we have only the barometers left on board.

The windmill being completed was mounted to-day on the ice, without sails, and rattled away in fine style. We shall leave it running over Sunday to let all bearing parts wear smooth, and Monday place it in position on board ship. It will be tried first with the shifted bilge-pump in the corner of the fire-room hatch, for if it will work that, there is saved the necessity of making a new pump rig of boiler tubes.

We took down to-day the fore-castle tent awning, letting a flood of daylight down on the berth deck, where it has been so much needed. And to make room for the windmill, the big skin boat baidera was removed from the bridge, where it has been all winter, and placed on barrels on the floe. Slowly, piece by piece, we shall remove our winter disfigurements, and gain gradually a ship-shape appearance.

A very curious occurrence was noticed by me this

afternoon while taking sights. The artificial horizon was placed on the ice as usual, with the wind carefully excluded by pressing the roof well into the surrounding snow. The surface of the mercury was smooth, and the reflected image of the sun perfectly sharp on its edge; but there was a rising and falling of the image, gentle, of course (else the edge would have become blurred), but so decided that I had great difficulty in making perfect contact. It was as if the horizon trough were in so nearly an exact equilibrium on a knife edge that a breath produced and continued the motion. Could it possibly have been a swell? I have thought much over this occurrence, but cannot account for it. If the whole ice-field had been swayed up and down see-saw, I ought to have swayed with it, and the motion of the mercury would not have been noticeable; but as it was noticeable, could there have been a break between me and the artificial horizon, and my piece have remained fixed while the other one rose and fell?

Considering that we are all (excepting Danenhower) in such perfect health; that our scale of food contains so much fresh bread and canned vegetables, with milk, butter, and other anti-scorbutics; that we have so many fresh potatoes, sixty pounds each week; and that one of our three barrels of lime juice is now consumed (since December 6th, much sooner than I anticipated), I have decided, upon consultation with the surgeon, to reduce our consumption to an issue of the regular ounce on Tuesdays, Thursdays, and Saturdays. I think it would be difficult to mention a more healthy crew in Arctic experience than we are, after our winter of damp, cold, anxiety, and danger. Before long these things will be of the past, and we shall forget them in our expectations of the future.

At two A. M. sounds were heard from the S. E. and E., where the ice was in motion.

April 18th, Sunday. — Another week gone, and but a few miles nearer the pole than we were last Sunday. The winter is “lingering in the lap of spring” with a vengeance. If the spring lingers in the lap of summer in like manner, our progress in any direction is very problematical. One needs an inexhaustible fund of patience under these circumstances, and an amount of hopeful anticipation not called for in lower latitudes. Each night when I write up my journal, I am strongly impressed with the fact that I have made no valuable addition to it, and yet each night I hope for something better on the morrow. Much as I have written here, it conveys no idea of the extent of the thinking, which cannot be recorded properly. No plans can be definitely formed in our situation. Much depends on what is presented to us from day to day as the ice breaks up (if it ever does), the condition of the leak at the time, and our ability to handle the ship under canvas with her necessarily bad trim. When the time comes action will be taken, based generally on the feeling that a fight should never be given up while there is a chance of the slightest success.

At ten A. M. I inspected the ship, finding everything assuming tidy and ship-shape appearances, and being impressed with the fact that if anything more were put in the fire-room the engineer’s force would have to move on deck. Then divine service was performed. Our Sunday dinner is always something looked forward to with pleasure. All winter we have had roast seal or roast bear with cranberry sauce, macaroni, potatoes, pickles, bread, a soup, of course, duff, coffee, and chocolate, and always a glass of ale, or porter, or sherry, as

the case might be. I do not think our bill of fare could be much improved.

As will appear from my bills of fare mentioned herein before, one day in the week, Saturday, has been allotted a certain amount of pemmican. Our American pemmican had been exclusively used to within a week, and it occurred to me to give the English pemmican, carried in the *Alert*, and purchased by Mr. Bennett from the admiralty, a trial; accordingly, an issue was made of it. I confess we did not like it in its simple form as well as that of American manufacture. It was dull and tasteless. The pemmican was of the sweetened kind, much preferred by the English to the unsweetened, as I was informed by Captain Markham. It being suggested that it would make a delicious soup, our Chinese steward was commanded to prepare some and also to make a stew. But as he decided in his own mind that he knew a trick worth two of ours, he mixed so many things with the compounds — for instance, bacon with the soup, and corned beef with the stew — that we were bewildered as to what particular taste predominated, and the experiment had no value. I must admit that the steward made very savory and acceptable food in both cases, but our purpose was defeated for the present. Between the two kinds eaten out of the hand, as might frequently be the case while sledging, we give the preference to American pemmican. Besides having more raisins to increase the saliva, the meat and fat go down together, while in the English article the chewing is drier, and the fat seems to separate from the meat and cling to the roof of the mouth. As a soup and as a stew, I shall express an opinion after a trial.

The wasting action of the ice-field on the surface, as remarked by me heretofore, still continues. From

aloft the view is far less discouraging than it was a month ago. Then the ice-field was all broken up by confused masses and heaps of shattered floes, the result of the winter's conflicts. Under such circumstances I fear five miles a day would have been an impossibility with loaded sledges. Now these masses are greatly reduced, and though rough and hummocky they are not impossible to pass; I think a mile an hour might be made without great difficulty. Then if we had been forced to abandon our ship by her being destroyed we could have reached the Siberian settlements only by a miracle; now, if our ship by some accident is taken from us, our chances of reaching Siberia, or open water, are greatly in our favor. By excellent observations I establish our position to-day in latitude $72^{\circ} 45' 46''$ N., and longitude $178^{\circ} 16'$ W., and a magnetic variation $22^{\circ} 15'$ E.

April 19th, Monday. — In progressing with the work of cleaning ship the starboard chart-room had its turn to-day. The accumulation of ice was considerable back of the drawers, where the moisture from the cabin had condensed, but not so great as in my room and in the tiller-room. To try to force the backward spring I altered the arrangement of things in my room, closing the door leading into the chart-room, and opening the door communicating with the cabin, and thence by the starboard door to the deck. I am somewhat premature, I find, for my room is too cold for comfort, whereas during the winter I was at least moderately comfortable. Having had the box containing the transit instrument under my mattress ever since leaving San Francisco, I concluded to place it under my berth instead, thereby gaining a more comfortable rest in a less elevated position.

I do not know that I have laid particular stress hitherto on the excellent salt beef which we have. It is served out on Monday regularly forward and aft for dinner, in addition to the regular diet. It is beyond exception the finest salt beef I have ever eaten. Our process of packing it in snow and soaking it in sea water softens it while it entirely removes its saltness, and it is thoroughly enjoyed. To-day our steward surprised us with a delicious potato salad with canned chicken,—a novelty, I undertake to say, never enjoyed before in the Arctic regions after a winter's experience. We have other good things in the shape of ale and porter in barrels. Were I undertaking another cruise of this character I would take three times as much as we brought, at least, and as much more as the vessel could stow. It is beyond all estimable value for cruises of this kind. Hoff's bottled malt extract is no doubt very good in its effect, but from its peculiarly bitter-sweet taste it seems more like a medicine than a beverage. We have had a glass of ale, or a glass of porter, or a bottle of this extract for dinner aft on Wednesdays and Sundays, and forward it has been served out sometimes once a week and sometimes once a fortnight. We made an unpleasant discovery to-day in the shape of fresh dampness on the berth deck. I think that ice has formed between the frames outside of the berths, by the condensation of moisture from the men in sleeping. At all events a drip takes place into the lockers under the berths, which makes it impossible to keep clothing there. At the first of the leak caused by injury to the ship, the water being choked off in the fore peak rose between the frames and flowed over on the berth deck, keeping it wet, and now a similar result is threatened. We shall avoid it, however, by

bolting long strips of battens lengthwise to the deck in-board of the lockers and caulking them, and by boring holes in the deck to let the water descend into the fore peak and flour-room.

Iversen, while a mile and a half south of the ship, found and brought in the following articles: seven small pieces of wood, one bunch of vegetable matter, one piece of birch-bark, and one small leaf. These were, of course, originally from the land, probably Siberia, but when, how, or under what circumstances they left the land must remain a mystery; although we know that being found so close to the ship they are not of this year's arrival. Nothing more has been seen of the supposed land of the 15th inst., so I cannot connect these fragments with it. At midnight heavy water-sky from E. S. E. to S. W.

The windmill was mounted in place over the star-board side of the bridge and secured. Two of the legs of the supporting tripod rest on the bridge, and the third on the water-tank. A hole is bored down through the bridge for the connecting rod which the machinist is fitting, while Sweetman is at work with a new pump brake rig, to connect it with the bilge-pump, in the after corner of the fire-room hatch.

April 20th, Tuesday. — One of the two walrus killed some time ago was left out on the ice close to the ship until the want of dog food necessitated its being cut up. At the time of its capture Alexey remarked that "it had young one inside;" and Mr. Newcomb's zeal to possess it as a specimen almost tempted me to have the necessary post-mortem examination made on the spot. As, however, it would have been difficult to keep the meat from the dogs (while left as it was its soon frozen hide made a per-

fect armor, against which even dogs' teeth could not prevail), I concluded to wait. To-day, however, it was cut up, and to our astonishment, instead of a foetus, we found part of a young seal (oogook) in its stomach; known to be young because having its first coat of hair. It is well known that the walrus eats shell-fish, clams, etc., which it digs up with its tusks, but this fact proves the carnivorousness of this mammal.

Mr. Dunbar and Alexey while away on a tramp to-day shot and apparently killed a walrus, but he escaped them by sinking. The place recommended to fire at is under the throat upward, that the ball may reach the brain. Such a tremendous bone is over the brain that a bullet will flatten on it. Mr. Dunbar's shot struck him in the neck, and the wound appeared to craze him, for he tore along breaking through young ice, bleeding heavily, without attempting to escape by diving. Alexey then fired and hit him in the head, whereupon the carcass straightened out and sank.

Everything being in place, the windmill was attached to the shifted bilge-pump to-day and set to work. The wind was hardly strong enough to enable it to work this large pump, the mill occasionally hanging fire on the centre. As it was originally intended for a pump of boiler tubes three inches in diameter, making it work a pump six inches in diameter was hardly a fair trial. We were calling upon the pump for four times as much work as it was designed to perform. However, with slight change, we believe we can make it work this pump, and so save the time and labor necessary to make a three-inch pump. The change suggested by Chipp is to remove the canvas sails and substitute tin ones, which being but little heavier will stand flatter and offer more resistance; and this is put in train, the

dozen of empty tin boxes on the floe being used as a stock.

April 21st, Wednesday. — Upon examination this morning we found that the ditch around the stern was completely flooded, the lower layer of ice having evidently been broken by the upward pressure of the water beneath. No serious difficulty is anticipated from this, however, because the comparatively reasonable temperature which we are now experiencing will not cause very heavy ice to form, which would hold the ship down. We are still hoping and praying for a release. We have seen so much water-sky around us that we have grown impatient at our imprisonment, and anxious to move on in some direction or other for a change. A raven (*Corvus carnivorus*) came from the southward to-day and stopped near the ship. But of course the dogs ran for it, and it flew away, proceeding to N. W. A very faint suspicion of land again, this time in N.

April 22d, Thursday. — Another bird paid us a visit to-day, this time a small, dull-colored land bird, which came from the S. E., and being driven off by the dogs flew to the west in an undulatory flight of quick, short, intermittent strokes of the wings.

Snuffy, our dog with the broken nose, has a most wonderful power to hold on to life. Although I know that he will never be of use again, I hardly like to have him shot, preferring to give him all of his life that he can hang on to. Occasionally he seems going, as, for instance, to-day, when he was lying on an old mattress on the rubbish heap, seemingly at his last gasp. Being occupied with taking sights, I postponed his shooting until the afternoon, when, going out to see that he had not died in the mean while, I found him gone one hun-

dred yards or so, and as frisky and far from death as ever. No doubt this is a small thing to set forth at such length, but when all days are alike, and but little occurs to break the monotony, even an occurrence like the foregoing seems an unusual item.

At nine P. M. we thought we saw land N. N. W. beyond a doubt. But as we brought our glasses to bear on it, it was doubtful if it was not a cloud. There was so much open water around the horizon, and so much water-sky above it, that all sorts of shapes were presented to our view in mist or cloud. As we are now where no ship has ever been, so far as is known, we are prepared for some kind of a discovery, and as land is most in our thoughts we are not unwilling to believe the first glance of our eyes.

April 23d, Friday. — Having a clear, bright day after eight A. M., we took advantage of the glorious sunlight to air bedding and clothing, and at the same time scrub and clean the berth deck. It will seem strange to some to air bedding at a temperature between 3° and 7°, but to us the air is soft and almost balmy, and we bathe, so to speak, in the brilliant light. To see our dogs basking in the sun at this temperature, fat and lazy as walrus meat and no work can make them, one would imagine we were in the tropics. As the sun goes down (somewhere now after nine P. M.), and our canine friends begin to come home to roost, the moisture condenses on them as frost, and they look like puff-balls. But still they sleep on, insensible alike to cold and frost. At 8.30 P. M. we had a visit from a snow bunting (*Plectrophanes nivalis*). Before Newcomb could get a shot at it the dogs went for the bird and drove it off. It came from the E. and flew to the S. W.

April 24th, Saturday. — Sounded at noon in thirty-

seven fathoms, a drift to N. N. W. being indicated by the lead line. I got a meridian altitude showing N. $72^{\circ} 52'$ for our latitude, so we are proceeding to the northward, at all events, as well as deepening our water. That we may continue to do so is my fervent hope, for the higher the latitude the more satisfaction, and the deeper the water the greater chance of a speedy breaking up of the ice, by reason of movement by wind or the yet to be discovered current.

A measurement of the thickness of the floe at the sounding hole gives forty inches; and as at the last measurement it gave forty-eight inches, a waste has occurred to just the extent of eight inches.

April 25th, Sunday. — The passage of another week and the arrival of another Sunday becomes memorable, because we have progressed nearer to the Pole by nine miles. During the past week S. E. has been the prevailing wind, and we have correspondingly gone N. W. That we have thus drifted indicates a loosening of the ice to the northward and westward, probably in the neighborhood of the Liakhof (or New Siberia) Islands, from 74° to 76° . As the season advances and the weather grows milder, the ice openings and perhaps movements ought to be greater to correspond, and we may be able to extricate ourselves and accomplish something yet. Our soundings to-day are something extraordinary, — forty-four and one half fathoms (hard bottom), — being an increase of nine fathoms since yesterday. We may have struck a deep hole, or we may be leaving the shallow water in which we have been drifting all winter, and getting to veritable Arctic Ocean. A northerly drift being still indicated by the lead line, we shall be to some extent wiser to-morrow.

At ten A. M. I inspected the ship, finding the berth

deck nicely clean, and, satisfactory to say, quite dry. We are so changing from the torpid appearance we presented during the winter to the ship-shape and tidy condition we are generally accustomed to that, were it not for the leak and the steady pump, pump, we could soon forget all our past discomforts in planning for the future. Following inspection, we had divine service in the cabin.

April 26th, Monday. — Our soundings dropped suddenly to thirty-one fathoms (thirteen and one half fathoms less than yesterday), and as our position to-day (latitude $72^{\circ} 56'$ N., longitude $179^{\circ} 16'$ W.) is only two and one half miles N. W. of our position of yesterday, we must assume that we struck a deep hole.

A bit of excitement occurred this afternoon at 4.30 by the cry of "Bear!" A young, or at all events small, bear had come up to about three hundred yards of the ship, when the dogs gave the alarm, and out tumbled Chipp, Dunbar, the natives, and the dogs in pursuit. His bearship left incontinently, and as the snow-drifts made heavy traveling for bipeds he succeeded in escaping, to our regret, as young bear is fine eating.

April 28th, Wednesday. — By three P. M. the windmill was in place, and connected with the shifted bilge-pump in the corner of the fire-room hatch. The sails made of sheeting having been found to possess too little surface, and to sag in too much, had been removed, and in their places fans made of sheet tin (utilized from our empty coffee and sugar tins) had been secured with wire stops. So well did the new rig work, that at eight P. M. we stopped pumping forward by hand, opened the starboard flood-gate, and allowed all the water to come aft. Up to midnight the windmill was working admirably, enabling us to save a little coal on

the steam-cutter rig, which is now used for distilling only. To provide for light wind, Melville commenced to-day the construction of a pump of boiler tubes, also to be worked by the windmill. To determine by experiment which will be the most economical of fuel, — the Baxter or the steam-cutter's engine, — I directed Melville to use the Baxter hereafter for distilling and unavoidable steam pumping.

Chipp has been hard at work of late making fuses and torpedoes, in anticipation of our needing them for our future operations. We have plenty of powder for blasting purposes, and Chipp, with his torpedo experience, has manufactured the necessary weapons. Mr. Dunbar has earned among us the reputation of making a mile, according to his reckoning, as near two, judging from our feelings, as can be. Last fall, upon the occasion of killing some walruses, he came back for a boat, and as he said the distance was about a mile, the doctor, Melville, and myself started with him, a team of dogs dragging the boat on the sled. We ran the best three miles I ever saw, and were pretty well used up before we got to the end of his mile. To-day, when he started out, I got him to carry a pedometer hitched to his pocket. On his return he said he thought he had gone about three miles in all, but I could see in his face he felt he was saying too much — that he ought to have made it less. The pedometer read five miles. Rule: Multiply Mr. Dunbar's estimate by two, and then judge whether you are game to hold out.

Although I am sure the ice is wasting under the sun, it wastes far too slowly for me. I am anxious to get on. To-day our latitude is N. $72^{\circ} 59' 54''$ (almost 73°), and I am hoping that 73° is a barrier which, once passed, we shall go on with some credit to ourselves and the name

the ship bears. The snow is soft, and the walking extremely bad. Without any warning one flounders in up to his knees in rifts between chunks, and the shock of the slip and the hauling out of one's legs soon disgusts the most zealous walker.

And yet we cannot find any snow fit to make drinking water. Try we ever so carefully, in our choice to take the newest fallen, to seek the crevices where snow may have lodged on other snow, escaping ice contact, the result is the same, with this exception, I almost believe, that the newest fallen is the saltest. Using such snow for drinking or cooking is out of the question.

Temperature begins at 20° , rises to 25° at noon, and falls to 13.5° at midnight. As soon as the sun sets (now somewhere about 10.20 P. M.) the temperature changes quickly. As long as the sun is in sight one can almost see the cinders and ashes settle in the snow. The black absorbs so much heat that it eats its way down like magic. Oh, as I have said before, that the snow and ice were only black!

April 30th, Friday. — The last day of April. Our total drift, as shown by observations, for the month, amounts to eighty-four and two tenths miles to and fro. Actually made good in a straight line forty-six miles to N. 50° W., — slow progress, and almost disheartening. Still it is an advance, and that is something.

The sunrise was obscured by fog, but the sun set at 11.23, being enormously enlarged by refraction, and having an inverted parhelic segment over it very much smaller than the main disc. This is having daylight with a vengeance. I could not help feeling for those who are obliged to support life (and apparently with comfort) with much less.

Chipp observed a flock of about twenty ducks (eiders)

flying high and steering west. No doubt they were bound for some land in that direction, but though we strained our eyes and glasses as the sun got around there we could see none of it. Removed our cabin porches to-day, letting in much desired light.

May 1st, Saturday. — Sun visible at midnight. The month of May set in with as clear, bright, and beautiful weather as I ever saw, and even the grim, icy monotony of our surroundings was not enough to prevent us from enjoying it. A bright sun, absolutely cloudless sky, and a temperature during the afternoon of from 27.5° to 29.8° , made up together a romantic Arctic day, needing only navigable water to make it perfection itself. Such a thing as remaining on board ship was out of the question. Everybody except Danenhower was out on the ice. Doors were thrown wide open, fires were let die out, and all hands gave themselves up to basking in the beauty without. It may be hard to believe, but really some of us were sunburned to a brilliant red. The dogs actually panted with the heat, and were disagreeably warm to the touch. Our spare sails, which have been exposed all winter to the weather on the poop, were overhauled and found in perfect condition, having suffered no injury whatever, and were treated to a sunning; and generally such an airing of clothing, bedding, and awnings took place, and such a pleasurable bustle, that one was led to look with some expectation to a brighter progress in our movements than had heretofore characterized them. To make the day still more eventful, the sun, which had risen at $0.55'$, remained with his upper limb above the horizon at midnight, as if loath to quit so pleasant a scene. By a curious freak of temperature common to us of late, the thermometer commenced to fall as soon as the sun

had passed the prime vertical (about 5.25 P. M.), and as the day closed had tumbled to 1.5° , — a disagreeable reminder that one May day does not make a summer any more than one swallow does.

Mr. Dunbar having in his wanderings come across two sets of bear-tracks about three miles from the ship, along a small lead in the ice, a trap was sent out and set for them. They had evidently caught a seal asleep and eaten it, for blood was on the ice in various places.

A calculation of the amount of the leak, or, in other words, the amount of water pumped over board, results in placing it at 300 gallons an hour, — a vast improvement over February 20th, when 1,647 gallons per hour were pumped out of the ship. The cause of the decrease can only be conjectured, for we may not know it for some time. Either that portion of the forefoot which we assumed to have been broken has been shoved back by ice pressure and closes the leak, or our cement and other material are doing more toward checking the inward flow of the water than we had counted on. I am sufficiently grateful, however, for the saving of fuel thereby resulting, to prevent me from finding fault with either cause.

May 2d, Sunday. — Since placing the compasses in the binnacles on Friday, I have carefully watched them to get a deviation table made up from my magnetic bearings from the ice. A very curious feature has been observed in connection with them. As the temperature falls each night (sometimes getting down to single figures) the needles are drawn to the right several degrees, and as the temperature increases in the morning they gradually go back again, resuming a normal position when the temperature, generally speaking, is 15° and over, as the needles of the compasses (Ritchie's liquid)

are of course not light or delicate enough to indicate secular variations; and as no such movement of the ship in azimuth takes place, I can only account for it by the action of the temperature on the mixture of glycerine and alcohol on which the cards float.

In anticipation of the coming of warm weather and the consequent hunting to ensue, a general cleaning and overhauling of rifles and shot-guns took place on Saturday, some miscellaneous target firing taking place with good results, as showing skill. Everybody felt satisfied that with such marksmanship and the trifling assistance of a bear-trap some game must soon be hanging in the rigging. To-day the trap was visited, but to the disgust of everybody was untenanted. Two bears had visited it, and one had even trodden on it without being caught. In setting it the trap had been buried in the snow, which hardened so much around it as to make it impossible to close. Hence our disappointment. However we have not finished eating our last capture, and to-day at dinner could well appreciate that a bear on the table was worth two not in the trap. At ten A. M. we had general muster, and read the Articles of War, after which I inspected the ship, finding everything trim and neat. Our colors were set for the first time in this part of the world I am certain. At the conclusion of the inspection divine service was performed.

May 3d, Monday. — Our first case of eyes damaged by snow occurred to-day in Mr. Dunbar. The man of most experience, and generally the greatest care in such matters, is the first to go under. His is not a serious case, however, and he will be around in a day or two. His eagerness to try my Winchester led him to wander around looking for bears more than was prudent.

May 4th, Tuesday. — Our experience on this cruise may not only be of advantage to ourselves but it may serve to accomplish an improvement in some articles of Arctic outfit. On one occasion when Melville and I sat looking at our stove and wondering if it could not be made to answer more than one purpose (for so economical have we become that nothing seems valuable for future equipment that cannot do at least two things), the question came up as to whether a stove might not be made to distill water as well as keep a room or cabin warm. Melville promptly said yes, it could be done, and that even our cabin stove might be made to distill, with some additional fittings, a small quantity of water; but that the necessity of arranging those fittings, so that the salt or scale might be removed as it accumulated, would involve such a disproportionate amount of gearing for the result gained, with so much additional consumption of fuel, that we would be not as well off as with our present distiller, especially as we have to pump by steam. Recurring to the subject to-day I asked him to give me his plan of such an apparatus as would heat and distill with the greatest economy, for some possible Arctic ship in the future. I am so convinced that he has solved a great problem and produced an incalculably valuable article of outfit, that I would be almost sufficiently ready to undertake another Arctic voyage for the express purpose of proving it.

Should we be so fortunate as to return without having had the scurvy break out among us, I think it will be because we had pure water to drink, for I do not think that our situation is thus far any less prejudicial to general health than the Tegethoff's or De Haven's Expedition, both of which wintered in the pack and

were afflicted with scurvy to a considerable extent. But inasmuch as the Nares' Expedition were consuming water which was pure (according to the nitrate of silver test, as testified to by Dr. Moss), and yet broke down with scurvy, there may be some other cause to affect us which we have yet to learn (and avoid, for we do not want the proof by experience).

It is very hard and almost impossible to get men to understand the importance of this matter (when I say men I mean the average seaman before the mast). Last fall when I was straining every nerve to keep snow water from being drunk after we found it becoming impure, and burning coal more precious than diamonds, to distill with the Baxter boiler, some outrageous things would occur. Though the men knew that diarrhœa had been caused by impure water, and that it would continue while such water was used, no judgment could be discerned in some of them. For instance, as the supply of distilled water was just equal to the demand for drinking and cooking, it would not be quite cool at all times, and though a moment's exposure of a tin pot to the outside air would have cooled it more than enough, goodness knows, a man would fill his tin cup half full of snow before dipping it in the barrel, not only making his own potful impure but spoiling more or less the water in the barrel. Of course that was stopped, the barrel headed up, and a faucet inserted, and the fireman on duty put in charge of it. Again, the cook finding the snow water, for cleaning dishes, etc., pleasant enough to the taste, would add much or little to the tea water as the distilled water was more or less scant. This could be stopped and was stopped. To him the idea of necessary quantity was more important than any over-sensitiveness as to quality. These merely illustrate the lack of judgment.

Now the difficulty arises about insuring the wearing of snow-spectacles. They are inconvenient, and to some unpleasant, but none the less important and necessary. Though they may not entirely prevent snow-blindness, they will guard against it longer than an uncovered eye, and make its effects less painful and lasting. I see that human judgment will lead the average seaman to prefer certain snow-blindness to a probable freedom from it, and hence I shall issue a stringent order on the subject.

At four o'clock this afternoon a large bear paid us a visit, and but for our haste might now be adorning our rigging. The reporting of a bear sets us all on fire, and away we go. When Ericksen came into the cabin and said "Bear," out jumped the doctor, Newcomb, and myself with rifles and sped over the side. The dogs seeing us rush jumped to their feet, and scenting or seeing the bear about two hundred yards off made for him. That was enough; he turned and ran. I fired at him (hitting him, I afterwards learned, in the left fore-shoulder), but on he sped, dogs and all in chase, and though hotly pursued he gained so much that when at three miles he came to a water lane one hundred yards wide, he had time to swim across it, and gain some hummocks on the other side before Alexey got to the edge. Here Alexey fired, and says he hit him, but he went down behind the rough ice and was seen no more. He says before he fired he saw the blood flowing from the bear's left shoulder, and had seen the bloody trail he left behind.

A pleasant report came back from the open water that there were "plenty birds," and as we are much interested in that fact from love of bird pie as well as for naturalist's reasons, Mr. Newcomb prepares for a battue on the morrow.

May 5th, Wednesday. — To-day is memorable as showing our position to be west of the 180th meridian, an extraordinary occurrence in view of the stiff N. W. wind and the indicated drift S. E. by the lead line. Either our ice-field must have acquired sufficient movement during the long continuance of S. E. wind to work to windward with the change, or we are in a N. W. current. I do not change the date, for in a day or two we may begin to go back and soon find ourselves east of that meridian, necessitating a further change, and so on back and forth. When, therefore, we are so far in east longitude as to make our crossing to west longitude again a question of considerable time, I shall change our date. Meanwhile we will go on as before.

Our position exactly is in latitude $73^{\circ} 11' 24''$, longitude $179^{\circ} 37' 30''$ E., a drift of eight miles N. 63° W. having taken place since the 1st, or two miles a day perhaps. Newcomb and Alexey went out on a shoot-



The Black Guillemot.

ing excursion and brought back three guillemots. Nothing could be found of the bear shot yesterday, and so we are that much out.

May 6th, Thursday. — A party going to the lead three miles S. E. of the ship found it slowly closing up from the movement of the floes, and they saw some guillemots and the tracks of a fox.

Tests for carbonic acid at ten P. M. on the berth deck give 1.69 volumes per 1,000, or .169 per cent. A very good showing for people living under our circumstances.

May 7th, Friday. — The water-sky is much diminished in extent, and travelers to the open water S. E. of the ship report it frozen over.



A FIGHT AMONG THE DOGS.

May 8th, Saturday. — The coming and going of one more day and nothing gained. This kind of life is really becoming monotonous. Each day finds our coal pile diminishing, and no sign yet of weather which would make it safe to stop our fires on the berth-deck and in the cabin. A temperature of 32° would be as acceptable as possible, although it is the freezing point of fresh water. This day commences with a temperature of minus 3.7° , and though the wind blows from E. S. E. all day, it gets no warmer than plus 12° at midnight. The weather is gloomy, depressing, and disagreeable. Velocities ranging from ten to twenty-three miles drive the snow from the face of the floe in clouds, and other snow falling makes distant objects, say one hundred yards, invisible. Here and there alongside the ship a little white lump indicates that there is a dog beneath it, and even the regular and irregular dog fights are discontinued until the weather gets clearer and friend can be distinguished from foe. I have intended for some time to dwell upon the peculiarities of our dogs, but each time the subject has seemed too extensive for my daily journal. Why they fight, how they fight, and whom they fight, seem to be purely abstract questions with them, so long as it is a fight. For instance, dogs one and two will see dog three in a good position, perhaps enjoying a meat can that has been empty for months and has, of course, no nutriment. As if by concerted plan one and two will spring on three, roll him over, and seemingly tear him in pieces. Fortunately the wool is so long and thick that an attacking dog gets his mouth full of hair before his front teeth reach the flesh, so no great damage is done generally. The vulnerable places are the ears and the belly. I have seen an attacked dog run, and, lying on

his stomach, shove his head into a snow bank with impunity, while his foes were choking over the hair they tore out of his back. However, this is a long digression. Suddenly dog three will turn on dog two and be promptly aided by dog one, his previous foe. By this time the whole pack has gathered as if by magic, and a free and indiscriminate fight occurs, until the advent of the quartermaster with the whip and a merciless application of it breaks up the row.

They divide up into little gangs of three or four, and in these friendly cliques they also fight. For days everything may go on smoothly, when one of the set does something offensive to his mates, and one of them (or sometimes all of them) administers a thrashing, and the offender is sent to Coventry until their feelings calm down. It is a common occurrence to see a dog on the black list, a quarter of a mile from the ship, all alone and afraid to come in until his time is up. He then approaches fawningly, wagging his tail deprecatingly to become reconciled, and is either welcomed with wagging tails or snarling teeth, in which latter case he retires to his isolated position for another spell. Another peculiarity is, that though they make no demonstration at any dog singly, or a team, going away, except the most doleful howling in concert, they seem to consider it a terrible indignity that he or they should presume to come back. The remainder of the pack scent the arriving one, several hundred yards off, and gather awaiting him. If a team comes in, a rough-and-tumble fight commences between the harnessed and the free, which requires two or three men to stop. As soon as the harness is off they are all smooth and quiet again, the cliques reassembling and moving off to their usual haunts. If a single dog, so much the worse luck for

him. As soon as he appears they are all on him. Let him be never so wary, and slink around hummocks to reach the ship unobserved, some one dog sees his head or his tail, gives the signal, and away they go. It is then a question of speed, for if the single dog but reaches his usual sunning or stopping-place he is safe; for, by some rule always observed, the getting to home base restores him to the full rights of citizenship. The cautious approach, and the great speed on the last stretch, are worthy of much higher intelligence than we usually give to dogs. The care they bestow on each other in distress or trouble, arising from disability, has a marked exhibition in the case of Jack and Snuffy. Snuffy had his nose bitten into in a fight at St. Michael's last summer, and in consequence his head is twice the natural size, by swelling and diseased bone. Jack is seemingly Snuffy's brother, and he is devoted to him beyond much human fraternal affection. He stays by Snuffy, cleans him, sees that he is not molested by other dogs, follows him into enemies' camps, leads him through in safety, and guards his retreat. Let Snuffy get a tid-bit, like an old moccasin or a piece of hide, Jack sees him secure it, stands by him while he chews it, and if he leaves it, chews it for him until he seems to want it again, when it is promptly surrendered. So accustomed have the pack become to this sort of thing, that they permit many liberties with their food which they would resent with a well dog.

Their cunning is extraordinary. Going out the other night at twelve for meteorological observations, about a dozen of them came around me in great excitement about something or other. Looking around for a cause, I observed a good-sized dog head first in a barrel at an angle, with only his tail and flanks sticking out. He

had gone in for some walrus meat at the bottom, and no dog had driven him out, because his stern view was not recognizable as belonging to a bully or not. Anxious to save the meat I went to the barrel and drove him out, when half of the gang recognizing him as no great fighter, pitched into him, while the other half fought among themselves for the entry into the barrel. For fear of catching a Tartar they had waited for some one to solve the conundrum, "Who is in the barrel?"

May 9th, Sunday. — At ten A. M. I inspected the ship. The berth deck is now dry and comfortable, and in good order and condition. I think our men really enjoy it; for, considering the size of the vessel, it is really cheerful and spacious. Far removed from the officers' quarters, there is no restraint upon the men's singing, smoking, and card-playing within prescribed hours, and they are made to feel at home. All the work being done in the deck-house, and the provisions being obtained from other places, there is nothing to interfere with their perfect occupation of their own quarters. The steam-pump auxiliary is in its new place in the store-room, which, by the way, is about as fully stowed as an egg, but dry and orderly. The deck-house is one large work-shop and receptacle for knapsacks, parkies, and boots, relieving the berth deck of much impedimenta. The galley-house is clean and remarkably tidy, the berths of the two Chinese being models of neatness. If the two that we have are fair representatives of their race, I consider them a wonderful nation.

The cabin is of course dry, neat, and comfortable. The ward-room is dry, but needs a scrubbing about the deck and paint work, which we are as yet unable to give it on account of low temperatures, and the danger of adding to Danenhower's disability. In him I can

see no change: if his eye seems to improve for a day or so, it only precedes a fresh outbreak, which makes it difficult to say whether or not it is as bad as it ever was. Being allowed by the doctor to be about the cabin during the day, with one eye covered up entirely, and the other protected by a colored goggle, and even in dry, warm weather, to go on deck under the awning for a few moments, carefully changing his foot-gear for rubber boots before going out, and changing back on coming in, — he became over-confident, began looking at and trying to distinguish too many things, then went a step or two outside the awning, in the full sunlight, and finally delayed changing his foot-gear, and the result is he is down in his room in the dark again, only allowed to come up to breakfast and supper blindfolded. How his case will terminate I cannot say. After inspection, divine service was performed in the cabin.

May 10th, Monday. — Another day of perfect monotony, waiting for the mild weather and open water, which do not come. Strange to say, however, good observations placed the ship four miles W. of where she was on the 7th. Either we have been in the mean time further W. and have come back again, or else lead-line indications are valueless. Latitude $73^{\circ} 9' 49''$ N., longitude $179^{\circ} 9' 55''$ E. If this latitude were only $83^{\circ} 9' 49''$, how much better satisfied I should be with our work of exploration.

May 11th, Tuesday. — An absolutely uneventful day. At three A. M. an occasional crack could be heard from the ice about the ship, but very faint and of no importance, unless it be a sign of wasting away. Really the sameness and monotony of this hoping and waiting are wearing upon me. Were we somewhat further north, we would not expect milder weather or a breaking up until

much later, but in our position I think I am justified in expecting a let-up soon.

May 12th, Wednesday. — A cloudy, gloomy, uncomfortable day. A seal was brought in, but unfortunately it was of the tee-gong (?) species, unfit to eat because of its strong turpentine taste. The odor from it as it lay upon the ice was sufficiently indicative of its character. I keep his skull. Mr. Dunbar and Alexey each shot a guillemot with a rifle, almost tearing the birds in pieces. As an evidence of good shooting, it was a decided success. And with this small record of a day's doings I must be content.

May 13th, Thursday. — The usual monotony of our daily existence was pleasantly broken in upon. Nindemann and Alexey while out to-day shot a seal and two guillemots, which they brought in, Nindemann dragging the seal behind him, — a laborious task, which he said had lasted for about seven miles. Mr. Dunbar took the entrails of the seal caught yesterday, and went out to set a bear-trap in the afternoon. At 9.30 P. M., Ericksen having the deck, Chipp went out to have a look around before turning in, and from the roof of the deck-house he saw, two hundred yards on our starboard bow, a large bear sitting on a hummock gazing at the ship. In a moment Chipp and Newcomb were on the house top with their rifles. Chipp fired first, and thinks he hit the bear; Newcomb fired next and hit, and then Chipp fired again, hitting this time without doubt, for down he went. The dogs quickly gathered around him, and Mr. Bruin got on his feet and made good traveling over tremendously bad ice and snow-drifts, although he was bleeding freely. The doctor, Chipp, and myself followed Newcomb in the pursuit, and by the time the bear got one quarter of a mile from the ship he halted,

showed fight to the dogs who stuck to him, giving Newcomb a chance to put another bullet in him, tumbling him over this time for good, and we hauled him into the ship. He was eight feet eight inches in length over all, and five feet ten inches in girth, and weighed about eight hundred pounds, rather old, but fat and tender, and a welcome addition to our larder. The head and skin were given to Mr. Newcomb, at his request, as trophies. The traveling, as I said before, was tremendously bad. The surface of the ice-field around us from a distance of two hundred yards outward is all broken and hove up, the up-ended pieces of floebergs standing at all angles and in all positions. The small amount of snow which has fallen during the winter has been swept in masses of drift in all nooks and crannies and spaces, making a most uneven surface. Here and there the crust has hardened enough to present an appearance of strength. One trusts himself on it, and immediately sinks to his waist. To get out is difficult. To get one leg out, the weight of the body must be brought on the hands, and they in turn sink in the snow, and the leverage is lost. Flounder, flounder, until by chance one foot strikes a piece of ice underneath, which gives support while the work of extrication is completed, followed very probably by another sinking, and so on *ad nauseam*. Frequently one comes to a more dangerous place between two floe-piece edges, — for instance, an end with a snow pit between, into which he sinks unexpectedly to his breast, and has almost literally to claw himself out with his nails. In fine, even the dogs flounder and struggle in vain, and some of them have to be helped out by man. Only the bears seem to have a knowledge of these pitfalls, and they profit by it.

I can now very well understand the enormous diffi-

culties of Captain Markham in his struggle northward from the Alert's winter-quarters, and I cheerfully admit the correctness of his cousin's remark, that no sledging could accomplish anything on the rough ice I would encounter north of Behring Strait. If anything should force us to abandon our ship, I am satisfied that we should be unable to drag enough provisions to enable us to reach Siberia; and that, unless aided by the growing improvement in the season we could kill enough to eat as we journeyed, our only salvation would be in coming to open water early in the distance, as did Weyprecht's party from the Tegetthof.

By my observations to-day, I locate our position in latitude $73^{\circ} 7' 46''$ N., longitude $178^{\circ} 57' 45''$ E., — a drift since yesterday of a mile and a half W. being shown. Whatever theory may have been advanced as to currents in this part of the Arctic Ocean, I think our drift is demonstrating that they are the local creation of the wind for the time being. As our drift in general resulting direction has been N. W. since our first besetment, so is it a fact that the greater amount of wind has been from the S. E., — our short and irregular side drift east and west and occasionally back to south being due to correspondingly short and irregular winds from N. W. or E. A glance at my wind record will make that clear.

As yet no land. Our log is headed, "Beset in the pack to the northward and westward of Herald Island," because Herald Island is the most northerly land we have seen; but Herald Island is now S., 41° E., 142 miles distant, and is rather remote to date from. A flock of birds flew across the bows from E. to W. this morning, as if indicating a land in that direction, but we can as yet see nothing of it.

May 14th, Friday. — It never rains but it pours — bears. This morning, at four, one approached the ship from astern, E. N. E., but before he got within good range the dogs saw him and made a rush at him. Mr. Collins started in pursuit with a revolver, but it was no even chase. A bear seems able to go when the traveling will use up a man. The temptation to follow in this case was strong, for at about every hundred yards the dogs would bring the bear to for a moment or two and allow Mr. Collins to get almost within revolver range. In this manner he went a mile and a half, and then relinquished the chase to Alexey and his dogs. These followed several miles, but Mr. Bruin was not overtaken.

Later on, Chipp saw another one on our port bow. He fired and hit the bear, for over he went; but taking to the rough ice Bruin got away, although chased. Ericksen and Bartlett followed on his trail, and after a tramp of seven miles lost him at some young ice. It is too bad that these animals have so much life, for those that are wounded probably die at some later time from the wound, and of course are lost to us. It seems necessary to fill a bear so full of lead that he cannot carry it to induce him to give up the ghost near the ship.

The new crank shaft and centre bearing of the windmill being finished the mill was again mounted, and attached to the shifted bilge-pump in the corner of the fire-room hatch. The wind was hardly strong enough to work the pump steadily, but still it did some good service. The engineer's force immediately commenced the construction of a small pump of spare boiler tubes, which will be run by the windmill in light weather. The men having completed digging out the trench afresh were occupied in various works about the ship,

particularly in cleaning and spreading to dry seal skins, in readiness for soles and moccasins. We must commence to provide for our necessities of next winter in that direction, for the amount of wear and tear on our moccasins has been very great during the past winter.

May 15th, Saturday. — Again a bear. Mr. Dunbar went out this morning to examine the bear-traps, and saw indications of their having been visited, for all the bait was gone, and the trap turned over without having been sprung. He and Alexey and Aneguin followed on the track, and after a long tramp saw two. One got out of range too quickly for a shot, but the other was keeled over and secured. Strange to say, it took seven bullets to do the work, a sort of running fight and firing being kept up for two hundred yards or more. At the end of five shots the bear again staggered to his feet and was making off, when two more bullets finished the affray. The prize was a she-bear, very thin — as Mr. Dunbar says, “all spars” (*i. e.* all legs and neck), having evidently been nursing a cub for some time, or having just weaned one. Very probably it was the full-grown cub that got out of range, leaving his mother to face the music. Upon being brought in and cut up, it was found that four of the seven shots fired had penetrated vital parts, that is to say, had injured such parts as would infallibly have caused death within an hour, and yet the bear was ready to get away to rough ice, and thus escape.

In the afternoon the doctor and I went out with Mr. Dunbar with a dog team to bring in the game, and I thus had a fine chance of “seeing the country.” Going out S. E. a mile and a half we came to what had been an opening, but was now covered over with young ice. Following this to N. E. for a mile or so, we came to its

end, and then striking to N. W. had some very heavy traveling until we struck a long lead of young ice, extending N. E. about three miles, where it ended at very old and very heavy ice. Leaving this we doubled back S. W. to the ship. One has need only to make such an excursion to be satisfied of the still greater perils we have escaped than those which we have endured. Where some of these floe edges have met and fought, rearing themselves fifteen and twenty feet in the air, no ship could survive.

Excellent observations to-day place us in latitude $73^{\circ} 13' 3''$ N., longitude $178^{\circ} 52' 45''$ E., showing a drift since yesterday of three and three quarter miles to N. 7° W. Besides being satisfactory as indicating progress of some kind, it is worthy of note as being the highest latitude yet attained on this side of the Arctic Ocean (that is on the sea), Collinson's furthest being, I believe, $73^{\circ} 11'$. And yet no land.

Sounded at noon in twenty-nine fathoms. Muddy bottom, a rapid drift to N. being indicated by the lead line. This is caused no doubt by a coming southerly gale, for the wind to-day is S. E., with velocities from eight to eleven miles, and there seems to be a generally unsettled look to the weather, which promises wind. The ice seems not only to exert a deadening effect on winds when they reach us, but actually to retard their advance. I venture to say we have never had the severity of a storm within the pack that has prevailed on its borders. Our highest anemometer velocity has been only forty miles, and it seems almost incredible that one should pass a winter in the Arctic Ocean with nothing greater.

May 16th, Sunday. — And again a bear. Mr. Dunbar went out with the natives this afternoon to visit

the traps, and finding nothing therein concluded to go in search of some game or other. After some little wandering he espied a bear some distance off, advancing toward him. Getting down behind some rough ice, Mr. Dunbar and Aneguin held the dogs down and awaited results. After some backing and filling, the bear concluded to advance in their direction, which he did for some distance before turning off, when the dogs were let go, and brought him to bay until Mr. Dunbar got a bullet into him. Then began a time. The bear made for the young ice and open water, and though shot again, managed to jump in, and went under. He swam for some distance under water, his track being indicated above him by the rippling; but he was obliged to come up for air, when Dunbar got a bullet into his head, which, after knocking out a big tooth, lodged in the brain and settled the case. To get the prize was now in order. Dunbar and Aneguin could not pull the carcass out of the water, though they had a line fast to it for that purpose. So leaving Aneguin to hold the bear, which required all his strength, Dunbar chased around until he came across other hunting parties, whose men he pressed for service, and whose dogs, aided by his own, brought in the game to the ship. Net result, five hundred pounds additional fresh meat; head and skin going to captor. Another male specimen, inclined to be "all spars," like the female of yesterday. Bears are becoming so common now that we feel that we want some ducks by way of a change.

To-day all the pumping was done by the windmill. A light easterly breeze almost died out in veering to S. E. at four A. M., but it soon sprang up again, still veering to S. S. E. and S., becoming gradually quite fresh, until at midnight it was blowing at a velocity of nine

teen miles an hour, with some very hard squalls. The windmill could not begin to find enough work to do, the bilge being kept dry. As we have been somewhat annoyed with a smell from the bilge for the past few days, we clean bilges in a rough manner to-day, by opening the sea cocks and letting in additional water, stirring up the mass and scrubbing with brooms, the windmill pumping out the water as readily as we could wish. As there has been a steady inlet of water and clear flow since January 19th, one would imagine that our bilges were clean, and, as far as clean, bright wood can indicate, they are. Unless there is some chemical decomposition of the sea water, or some decaying animalcule, I am unable to assign the cause for this odor to our bilges, and even if it is from one of the two causes above mentioned, I am unable to say from which one.

At ten A. M. I inspected the ship. We have now three on the sick list,—Danenhower, as usual, Sweetman, with neuralgia, and Ah Sam, the cook, with a kind of intermittent fever. Sweetman has had a bad tooth for some time, and the doctor has been unable to extract it because of its being, apparently, interlaced at the roots; and I am inclined to think the neuralgia is the result of that trouble. Ah Sam's fever may have arisen from a cold. These are two valuable men, and their sickness excites our warmest sympathy and consideration. The carpenter work may stand still, but the cooking must go on. In this emergency the steward calmly does his own work and the cook's too, just as naturally as, when the steward was sick, the cook performed both functions. This is another cause of my profound admiration for this race. I verily believe that either or both of them would undertake any duty,

and master its details in so short a period that their ignorance would not have time to become apparent.

To satisfactorily account for the small increase over last week's consumption of coal, 2,910 pounds, last week's consumption being 2,650, I may here mention that shavings, splinters, and small pieces of wood are beginning to come down to the bunker door with the coal, and are consequently shoveled into the buckets as fuel. There is also much fine dust which goes to swell the weight. As it all burns, however, it is considered as so much coal, and so weighed and served out. Melville's reasoning is, that nothing is lost by such an operation, because, he says, "We know that all that is not expended is in the bunker, which is a good place." I am more certain that we have more coal in the bunkers to-day than the books call for, than I am suspicious of our running short.

May 17th, Monday. — One more day come and gone, like many of its predecessors, with nothing to vary the monotony of our lives. We are still drifting north, but we see no land; and though we have had occasionally a water-sky to the northward, it seems to go before us as we advance, and we come to no result. Low temperatures and an unbroken ice-view do not seem to indicate a speedy liberation, but there is always comfort in the reflection that "we know not what a day may bring forth." I find patience to be an admirable quality under these circumstances, but I am afraid that patience long drawn out in these regions generates dullness. If we only had something to do that would be advancing the interests of the expedition, there would be some excitement in the life. Hourly meteorological observations are taken, it is true, and the ship's position daily obtained by sights, and then we have to

stop. Magnetic observations of any value are impossible, because of our ever-changing positions. Rough observations for the variations and dip are obtained, but they will serve only for convenient approximate reference, and will have no exact scientific importance. The constant change of position prevents any correct pendulum experiments from being made. No astronomical observations, except determinations of latitude and longitude, with sextant and artificial horizon, have been possible, because the erection of the observatory and the mounting of the instruments on the ice, in our situation, would have exposed them to loss should a break-up occur. Soundings are made daily, and specimens of the bottom obtained and preserved for future reference. Temperatures of the surface water are recorded every second day at the sounding hole, and that exhausts hydrography for us. At this temperature it is not practicable to add water cups and sea thermometers to our lead line, for it ices up so fast, and breaks so readily when frozen, that we might lose cups and thermometers. Natural History is well looked out for. Any animal or bird that comes near the ship does so at the peril of its life.

So far, therefore, as is possible, we do all that we can. People who have, like ourselves, been caught in the pack have been able to do no more, and in some instances not so much.

At two A. M., in a sudden squall, one of the wire stays preventing the fans of the windmill from spreading out parted, and the fans spreading out came against the tripod, bang, bang, breaking two of them short off at the hub. The stay of the other two held on, and with the wind blowing as it did, these two did all the pumping, as if nothing had happened. Fortunately the damage can be repaired without much trouble.

The carpenters have been engaged in making long runners for the keels of our large boats, in case we have to drag them over the ice in any mishap, while work still progresses on the small boiler tube-pump.

May 18th, Tuesday.— I went out this afternoon accompanied by Melville and Dunbar with a dog team, and striking the young ice about two miles N. E. of the ship, followed it to the westward as it ran for some three miles. I could have gone further, and would have done so but for my desire to get back in time for my sights at 5.30. As a specimen of Arctic scenery, the ice we met was very fine. The young ice covered an opening which was about two hundred yards in width, and in places five hundred yards. Towards the centre and along it ran a crack here and there, widening to a foot. Occasionally pools and lanes were met, the rippling of the water being a sight pleasing to the eyes after our long look at its frozen condition. On each side of this long avenue the pack of old ice stood piled up in irregular masses twenty and thirty feet in height, where great pressures had occurred. (A month ago there was no opening.) The thickest single floeberg I saw was not more than eight feet — other pieces twelve and fifteen feet in thickness, showing, upon examination, lines of strata where one had overridden the other. To the southward of the avenue, beyond the wall of ruins lining its edge, we could see a long plain several miles in extent, seemingly smooth ice, but as Mr. Dunbar had previously attempted to get to the ship by crossing it, he knew that it abounded in traps and pit-falls, where one would unexpectedly flounder and sink to his armpits. To the northward the ice was of the same hilly and broken character as the wall, and I am convinced that a sled could no more be dragged any considerable

distance in that direction (or, in fact, upon mature deliberation, in any direction), than it could be dragged across the house-tops of New York in an attempt to go to Harlem from the Battery. Whether these reflections are going on in the minds of others I do not know, for in any case they are not expressed, or any indication given of their being entertained. All our discussions, or rather conversations, for we do not discuss, include the ship as a prime factor in reducing any Arctic equation to its simplest form. Our chief difficulty of reduction lies in the fact that there are so many unknown quantities. Excellent observations to-day place the ship $73^{\circ} 28' 19''$ N., and longitude $178^{\circ} 51' 45''$ E., showing a drift of $2\frac{1}{4}$ miles N. 10° E. This is curious, because we have had an almost steady southerly wind during the preceding twenty-four hours; with easting in any change from true S., in consequence, we should have gone to the northward and westward, instead of to the northward and eastward. It may be that our field in passing along some heavier field (or, perhaps, land) has been shunted off by the resistance offered. Theory as to our movement is long since abandoned in my mind, giving way to facts based on experience. Theory may assert how we ought to drift, but our position from day to day shows how we do drift, and I accept the situation.

May 20th, Thursday. — Oh for warm weather! Only sixty tons of coal left, and the summer work yet to be done, with reference to next winter's warming, and pumping, and our cooking going on all the time. To put out all fires with the present low temperature is only to invite cold and sickness. To have come so far and accomplished nothing is very trying. If our ship were tight, all would be easier planned. But with an

injured ship I shall have to be careful how I handle her lest I jeopardize all hands. Something must be done, for we cannot rest content with a blank score; and with God's grace I will try to make some record to which I can look back with at least no regret or mortification. It is terrible to me to contemplate that the Jeannette has traveled so many thousand miles under my command only to overwhelm me with confusion at the end. How can I meet her godmother with such a meagre description of her doings!

The bright weather we are having is very cheering. An uninterrupted sunlight the whole twenty-four hours is a great treat, and would be fully appreciated if we could only avail ourselves of it in carrying the ship further N. in open water. Every day parties are out on the hunt, and I find that there is more or less complaint about soreness of the eyes. My stringent order about wearing snow-glasses whenever more than two hundred yards from the ship seems to be faithfully obeyed, and I have no doubt that their use, though not an infallible way of avoiding snow blindness, will nevertheless so mitigate the severity of the complaint as to prevent any one being laid up.

Our two invalids, Sweetman and Ah Sam, are back on duty again. By doing all the carpenter work in the deck-house, protected from exposure, I think Sweetman will not again be troubled with neuralgia. Ah Sam's complaint (intermittent fever) is an old friend of his, for it appears that he was afflicted with it in China.

May 21st, Friday. — Another bear. Mr. Dunbar and the two natives started off this morning on their regular visit to the traps, and finding nothing in them went on a cruise. When about five miles northward from the ship they sighted Bruin, and set the dogs on him to

hold him at bay. Getting within range they delivered a volley, all three bullets hitting and tumbling the bear over. Jumping to his feet again he singled out a dog, and, bleeding as he was, charged him fiercely; but Dunbar and Alexey again fired and finished him. The victors then brought in the skin and head attached. Having heard me say some days ago that I would like a nice head and skin for Mr. Bennett, Mr. Dunbar generously presented me his trophy for that purpose, and immediately commenced cleaning and preparing it. I design this, the most beautiful head and skin we have yet got, as a present for Mr. Bennett (if it proves acceptable to him) from Mr. Dunbar.

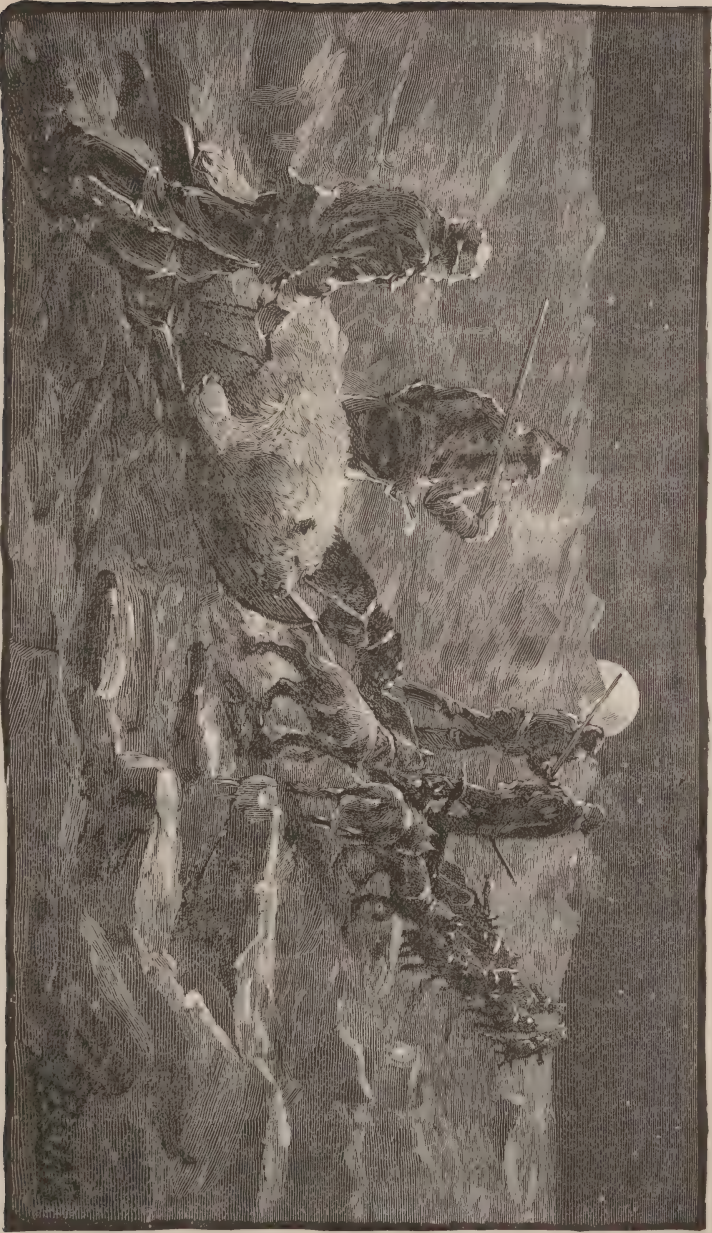
The windmill, being again in repair, goes to work and does all the pumping.

Took down our quarter deck awning to-day, letting in a flood of sunlight to the cabin and my room that was as pretty as a picture. At midnight a large flock of fowl, probably wild geese, flying from S. E. to N. W., crossed the stern of the ship within sight but not within range.

May 22d, Saturday. — This morning Melville and myself, accompanied by Aneguin, took a team of eighteen dogs and went out to bring in the bear killed yesterday. Upon reaching the young ice and proceeding along it for a mile, we found it had opened so much as to make us take to the rough ice for about a quarter of a mile to avoid it. Reaching the bear, we soon had him loaded on the sled and started back. So thin was the young ice, that the weight (425 pounds) of the cleaned and dressed carcass added to our weights caused the whole surface to vibrate more than once, and finally it broke under us. We had such speed on at the time that only the rear end of the sled went through, so we

escaped a ducking and the probable loss of the meat. Reaching the place in the rough ice where we had to turn off, we had a terrible time in store for us. With only the weight of the dead bear on the sled, the combined work of three men and eighteen dogs consumed an hour in getting over that quarter mile. The dogs pulled willingly enough, for they were homeward bound (and I notice that a difference of one hundred per cent. depends on that fact), and resented the delay by howling and surging at the harness until I thought the drag-rope would part. One minute the sled would be on one side of an uplifted floe piece and the dogs on the other, with a sharp ridge between. When by sheer strength we had pushed it up and over, it would plunge down the other side and stick in a hole heels up. Then we had to dig it out with our hands, and give it another start; then it would fall, one runner in a crack, and so on. Repeat these things in all shapes and varieties and they will give a faint idea. Suffice it to say, that at the end of the hour when we reached smooth ice again we were streaming with perspiration and almost exhausted.

May 23d, Sunday. — Another week has come and gone, and we are still held fast in our icy bed. Somewhere about this time last year it was that Captain Bailey, in the *Rush*, was blown through Behring Strait in a southeaster, and saw no ice in any direction within his horizon. We are having the southeaster again this year, but we can see no water in any direction within our horizon. The wind seems to howl viciously through our rigging, although it gets no greater velocity than twenty-one miles an hour at any time during the day, and our lead line shows a rapid drift to N. W. through twenty-seven fathoms of water.



RETURNING FROM A BEAR HUNT.

Inspected the ship at ten A. M., and then read divine service in the cabin. Otherwise the day passed without any eventful occurrence. While the wind blows so fresh, and to prevent future accident, two of the wings of the windmill have been removed, and we find that all the pumping is easily done by the two remaining. While it was undergoing repairs, the tin sails were so arranged as to be removable at will, and stay bands of flat iron were substituted for the wire rods. We have now, therefore, a more perfect and at the same time more durable machine.

May 24th, Monday. — A disagreeable discovery was made to-day, which will be more or less serious when we have ascertained a cause. Three little streams of water were found running into the shaft alley on the starboard side, just forward of where the line of the mizzen-mast would be if prolonged. The three streams if united would form a column three quarters of an inch in diameter. As no pressure has been experienced since January 19th, the date of our mishap, it is difficult to believe that it is caused by a leak, and it is rather too much water to be accounted for by the supposition that the accumulations of ice among the frames have commenced to melt. We shall have to await further developments before coming to a conclusion, and meanwhile it is one more added to my many cares and anxieties.

Observations to-day place us in latitude N. $73^{\circ} 49' 47''$, longitude E. $177^{\circ} 40'$, a drift of nine and a half miles N. 55° W. since yesterday. We are beginning to deepen our water also, getting thirty fathoms to-day. I am somewhat in hopes that we may eventually drift past this shallow part of the ocean, and reach a depth of water which will permit a breaking-up of the ice, and insure our liberation in time to accomplish something this season.

Mr. Dunbar went out to-day to the young ice, which he found had opened so as to leave a channel one hundred yards in width. Coming back over the heavy road where we had such a hard time with the sled on Saturday, he, by great good luck, found my meerschaum pipe which I had lost in my struggles, and only missed when it was too late to look for it. The length of time I have had the pipe, the reputation which it enjoys of being the "sweetest pipe in the navy," and it being a present, made its loss an affliction, and my sentiments of gratitude to Mr. Dunbar are of the liveliest kind.

May 25th, Tuesday.— Careful observation of the leak, or whatever it is, mentioned yesterday, shows no change. The same amount of water flows, and as mysteriously as to its cause as ever. We have wind enough to drive the windmill all day, and therefore have no difficulty in getting rid of the water. I think, however, the southeaster has blown itself out.

To-day's log is headed, "One hundred and ninety miles N. W. of Herald Island." These gradual additions of a few miles each day have gone to make up quite a distance. Since the 1st of this month we have gone roughly ninety miles to the N. W., due unmistakably to the prevalence of S. W. winds, but nevertheless worthy of remark, as indicating nearly as much advance in less than a month as we accomplished during eight months previously. From this I augur good results, for since our advance was prevented during the winter, because at that time the massing and cementing together of ice brought everything to a position of rest, so also is our progress now beginning at a time when the increasing temperature will naturally bring about ruptures and disintegration.

Alexey shot and killed a young bear at the same

place (about five miles from the ship) at which our last one was killed. This is the first young bear that we have had, and we shall no doubt find his tender flesh quite a treat. The circumstances of the capture are curious. Alexey had taken out the liver of the last bear upon its capture and left it on the ice. The young bear had taken it off to some rough ice, and while holding it in his fore paws had fallen asleep, in which condition he was found and fell a prey to Alexey's rifle.

May 26th, Wednesday. — A subsidence of the winds to light airs and calms. The effect, however, has been so good that I could almost wish for a continuance of the wind; for since the noon of the 21st it has drifted us forty-two miles to N. W. (roughly). It had another effect. It has blown so much snow across the face of the floes as to cut them like a sand-blast, and has permitted the direct action of the sun on the surface, so that in the afternoon there are signs of thawing and wasting. All black substances, like ashes and refuse, sink rapidly into the ice, and are now an appreciable distance below the surface; and the white and black bulb thermometers on the port side of the ship show respectively today 70° and 72° .

May 27th, Thursday. — The boiler tube-pump is completed and in place, and it works to a charm. We have now means of pumping the ship by the windmill in all sorts of winds: from four to ten miles, by connecting the boiler tube-pump; from ten to fifteen miles, by connecting the shifted bilge-pump; and above fifteen miles with the same pump, reducing the sail surface. The whole subject reflects great credit on Melville, who designed, and Sweetman and Lee, who constructed, respectively, the wooden and iron parts. Our "windmill pumping apparatus" is worthy of being handed down to posterity.

The Baxter boiler is now used exclusively for distilling. As the temperature of the air now is at such comfortable heights, more heat is radiated in the engine-room than is needed to make the man on watch comfortable, and Melville proposes to have the coil forward on the berth deck to heat that deck instead of using a stove. The idea is an excellent one, and it only remains to be seen whether we can put it into practical execution. So anxious are we becoming on the question of fuel, that we commenced yesterday going without a fire in the cabin and berth deck from nine A. M. to five P. M., and we find that we are not so very uncomfortable. The heat remains in the cabin for several hours after the fire goes out, keeping up a temperature above 40° , and as we are always out knocking around on deck, or on the ice, where the temperature is pleasant enough in the middle of the day, we find we can very well dispense with fire until supper time.

The amount of water leaking into the shaft alley seems to have diminished, and I am more inclined to think that it (the leak) was only the melting of the ice accumulations among the frames.

May 28th, Friday. — An uneventful day. We are at a stand-still, and must wait for the development of some strong wind to shove us along again.

May 29th, Saturday. — One more day nearer the end of May, and I hope one day nearer the end of our imprisonment. A gloomy and dull day makes one moody and dispirited under these circumstances. If our latitude were only 84° instead of 74° , I don't think anybody would mind the weather, but we make a very poor showing for one season's work. However, the darkest hour is just before the dawn, and who knows how bright our dawn may be when it comes. In the

hope that we might bring her further up by the head when the ice releases the ship and permits her to float, the bower chains were unbent to-day and stowed in the lockers.

May 30th, Sunday. — By observation to-day I find we are in latitude N. $74^{\circ} 5' 27''$, longitude 177° E., showing a drift since the 28th of three miles to N. 11° E. We have evidently gotten under way again, though for some reason we are prevented from going to the westward, perhaps by a heavy barrier of ice, against which our field is slowly grinding along. I have had an idea that our drift of late may be explained in some such manner; our field turning on a pivot as it advances, and eventually bringing us to its highest point, will throw us off to the eastward. The northwestering having been accomplished we are now doing our northing, and then going to N. E. will eventually be carried along E. by the current which sets E. through the Archipelago N. of the American Continent. Time will show the fallacy or the truth of this supposition; but meanwhile it affords a subject for contemplation.

The usual Sunday inspection and divine service. The high temperature being promising, I have directed that during the coming week the deck-house be taken down, the steam-cutter restowed, and the sleds dismounted. Our new arrangements for summer will be mentioned later on.

A very gratifying reduction in the coal expenditure has resulted from our doing partially without fire.

May 31st, Monday. — The last day of spring, and then we shall have summer before us. Let us hope that with spring may end all trials and tribulations, and that we shall now start forward to the accomplishment of some purpose. Our observations to-day are encour-

aging, for we are four miles north of yesterday, showing a tendency to go east a little, while going north more. The carpenters finished the keel runners for the boats, and Lee made bolts for them for securing.

After all we have no reason to complain of our progress during the past month. Our total drift has amounted to one hundred miles, and we have made good eighty-two miles to N. 38° W. Our average temperature has been 18.46° , and though we have had it as low as minus 8.5° , we have on the other hand had it as high as 35° .

CHAPTER IX.

A FROZEN SUMMER.

June — August, 1880.

Which Way does the Ice go? — Appearance of Insanity. — A Fall of Rain. — Danenhower's Case. — Bad Walking. — Mosquitoes. — A Day's Record. — Lanes of Water. — The First Punishment. — Stoppage of the Leak. — Melting of the Surrounding Ice. — The Ship in an Island of Ice. — Thickness of Ice. — Punishment of Dogs. — Irksomeness of Confinement. — Accident to Alexey. — The Height of Summer and the Depth of Discouragement. — The Resolution of the Company. — Fog and its Effect on Ice. — Speculations on Arctic Ice. — Studies of Sea-Water Ice. — Tests applied. — Sudden Encounter with a Bear. — Getting at the Propeller. — A Party of Bears. — Crimson Snow. — A Hopeless Outlook.

JUNE 1st, Tuesday. — The first day of summer — and a gloomy and disagreeable one at that. Occasional thick fog prevailed, and a frequent fall of light snow added to the general cheerfulness! Sounded at noon in thirty-three and one half fathoms, muddy bottom of course, and the lead line showed a drift to N. N. W. Commenced hauling the dredge again, obtaining this time a few shells and shrimps.

June 2d, Wednesday. — A lovely summer day! A gale of wind and a snow-storm. This gale must have been severe on the edge of the floe, wherever it may be, for as the ice exerts a deadening effect on the wind, we did not have, of course, the full weight of it. The snow was driven in clouds almost horizontally. It was,

however, very soft and mushy, melting almost as soon as it fell, so our water supply will not be benefited.

Although the surface of our floe is soft and mushy, and we can see it waste away, and though the water is all around our ditch, we seem to be no nearer liberation. The ice at the sounding hole is yet forty-eight inches thick, and the body of the ship seems to be held firmly by ice which does not thaw, with such a layer of water on top of it as our ditch shows. That waste does occur to the surface of the floe is evident, not only from the sinking of ashes and dirt, but from the appearance again on the surface of objects which were long since buried. This seems to afford the dogs great satisfaction, for they occasionally unearth things which they buried months ago, and thus lost, which they now find to enjoy to their hearts' content.

June 3d, Thursday. — The gale has blown itself out, leaving us generally clear and pleasant weather. Since May 31st we have advanced only nine miles to N. 27° E., or about three miles a day. Evidently the ice to the northward of us has no tendency to give way as yet, and we accordingly have cushioned off to the eastward. Now it is a very interesting problem (and we may have the good fortune to solve it) which way this ice goes, whether east or west, in the course of its path to an outlet. That it does not steadily set south and find an outlet through Behring Strait is proved by our drift N. W., and the fact that but little ice comparatively is met in Behring Sea in spring and none in summer. That it is not wasted entirely by solar heat is also evident. If it did not go somewhere, the accumulation of years would by this time have closed the Strait altogether. That it goes north is doubtful, because, probably, north of the 85th parallel the ice never breaks up

enough to permit navigation. Hence it must go either east or west. To go east is in accordance with the earth's rotation and complies with theory, while in fact the *Resolute* drifted east through Barrow Strait out into Davis Strait. To go west is contrary to hypotheses based on the rotation of the earth and the supposed direction of equatorial currents; but we have gone N. W. by the prolonged action and force of S. E. winds. Therefore the wind may overpower the attraction of rotation, and set the ice in this ocean so far to the westward as to bring it within the influence of the Polar current about Spitzbergen, and discharge it thus into the Atlantic. Or we may in time, in accordance with my theory, pass from the region of S. E. winds to a region of N. W. winds, when, from their prevalence, they have generated an easterly set, which, encouraged as it were and accelerated by the motion of rotation above referred to, may carry the ice to the eastward through the Archipelago, and cause it to mingle with the Polar current known to be setting south through Smith Sound and Davis Strait, and so on to the Atlantic. As to there being any warm current reaching to a high latitude, I very much doubt. We have found none; and I am inclined to agree with Lieutenant Weyprecht when he says, "The Gulf Stream does not regulate the limits of the ice, but the ice, set in motion by winds, regulates the limits of the warmer Gulf Stream water, depriving the same of the last degrees of heat which it contains;" and I pronounce a thermometric gate-way to the Pole a delusion and a snare. Of course if any warm current came through Behring Strait it would be the Kuro Siwo, and our sea temperatures indicated no such fact.

June 4th, Friday. — A very unpleasant report was

made to me by the doctor, namely, that Nelse Iversen, coal-heaver, was trembling on the border of insanity: this was as unexpected as it was astounding. The man all along had been bright and cheerful, and disposed to be active in his habits as well as attentive to his duty. For a day or two he has received medicine for constipation, and in his conversations with the doctor betrayed more nervousness and anxiety and general disquiet than such a disorder should have given rise to. This morning, however, on presenting himself at nine o'clock, he was very hysterical and nervous, informing the doctor in all seriousness that he was being watched, and that a mutiny was on foot among the men; that he had been approached on the subject, and asked what he would do in such a case, etc. Being closely plied with questions he burst into tears and became quite incoherent, going on with all sorts of rigmarole. He mentioned Sharvell, another coal-heaver, as one who had approached him on the subject of mutiny. This Sharvell is a mere lad, who would no more be suspected by me or any one else in the ship than a child. This is a serious case, and I can but hope that time will alleviate the disorder. But at best Iversen will always be more or less doubtful, and, of course, utterly unfit for any responsibility. First a blind officer, and now a crazy man — these will be serious charges on my mind in any emergencies. Observations to-day reveal the unpleasant fact that we are going backward, showing a drift of three miles to S. 34° E. This is not at all pleasant. Motion onward was pleasant enough, but we cannot say the same for motion backward.

At work all day in stowing away against the bulwark the deck-house planking and frame, in rearranging our deck load of provisions, in unpacking our sleds,

stowing the provisions and dog food they contained in the steam-cutter, and in general cleaning up around ship. We are gradually resuming ship-shape proportions, and shall soon be ready for a start northward and eastward, or northward and westward, whichever the ice and winds will permit, for, alas, our coal-pile is too small to think of doing any steaming except in a great emergency.

The thermometer beginning at 25° reaches 37° by six P. M. and closes at 30° . Very pleasant and agreeable, thus enabling us to be indifferent to having no fire in the stove.

June 5th, Saturday. — A day of no remarkable event, except that my observations for position reveal the unpleasant fact that we have been set back S. one half W. four and a half miles. This is due, of course, to the northerly winds prevailing during the preceding twenty-four hours. Some little encouragement can be drawn from the belief that our prompt changes of position, in compliance with change of wind, indicate a generally looser state of the ice than has been supposed hitherto. I am hoping strongly day after day for some indication of a coming liberation, but though we have nearly daily a tempting water-sky in some direction or other, no change yet comes. Chipp has his hands full in getting things into shape, but everything is progressing favorably, our decks are rapidly clearing, and we are surely approaching the time when nothing will remain but to hang the rudder and make sail when the ice gives us a chance to head toward some satisfactory result of our Arctic cruise.

June 6th, Sunday. — In my sanguine moments during the winter I used to hope for a liberation and consequent advance in May, but here we are in June and

everything frozen as hard as ever. However, *Nil desperandum!*

At ten A. M., just as we were going to call all hands to muster, a fall of rain compelled us to wait. It was a pleasure to see it, and a positive luxury to hear it pattering on the poop over our heads. It lasted but a few moments, unfortunately for us, because rain will do an immense amount toward thinning out the ice.

I inspected the ship, however, as usual, and found everything wonderfully neat and trim. We are quite clear enough to work the ship, as far as the spar deck is concerned; and it will be a subject for experiment whether, when she floats again, her trim so much by the stern will let her be handled under sail.

At one we had the general muster and read the Articles of War, and following this I read divine service in the cabin. We are almost down to our minimum expenditure of coal, — 1,425 pounds for the past week.

June 7th, Monday. — To-day our observations for position have produced a somewhat discouraging effect upon me. The wind having prevailed from the northward and westward, I was prepared for, and anticipated, being set to the southward and eastward, perhaps S. E.; but to my disgust my sights (latitude $74^{\circ} 4' 37''$ N., longitude $177^{\circ} 27'$ E.) showed that we have been set seven and three quarters miles to S. seven degrees W. Seven and three quarters miles of our hard fought drift gone in a day. Had we gone east I would not have minded it, for we always have something in that direction; but to go any further to the westward seems like trying to walk through a stone fence. There is plenty of water-sky around us, too, as if to tempt us with a sight of the impossible. As the wind still continues from the northward and westward, we must expect

more southing by to-morrow; but it will be doubly hard if we make westing again, because it will seem then that we have got a start for the coast of Siberia, and there is nothing of honor in that. Never mind, "The darkest hour is just before the dawn," and our dawn may be a bright one.

The men were busy to-day scraping the ship's side in readiness for painting. Surrounded as we are with ice, we nevertheless shall make a good appearance. Chipp already has the *Jeannette* clean and orderly, and will have her in fine cruising order by the time the water gets to us. Sweetman was at work securing the keel runners to the boats, while Nindemann varnished the binnacles and fitted "pantalets" to them.

To-day we discontinued fires in the cabin and berth deck, intending hereafter to limit our expenditure of fuel to what is required in the galley and for distilling. At first, no doubt, we shall feel the cold; but a slight discomfort now will weigh as nothing against accomplishing something this summer, or being comfortable next winter. It is well to notice here, that now that we have no fires in the stoves we boil our tea water by steam, using a pipe Melville has fitted to the Baxter boiler for that purpose.

June 8th, Tuesday. — Still going south and east. I suppose we shall go in this direction until a southeaster brings us up and sends us northwest.

June 9th, Wednesday. — Still going south, — one mile to S. 12° E. since yesterday. However, that is a slight affair, and hardly worth mention, for a promising feature developed itself in the shape of another S. E. wind, which, springing up at six A. M., freshens, and by midnight reaches a velocity of eighteen miles, with indications of growing still fresher to-morrow. The ther-

mometer begins at 19.3° , gets as high as 27.7° , and closes at 22° , — rather low to be without fires, but we do not mind it, at least most of us do not.

June 10th, Thursday. — A gloomy, disagreeable day ; no observations possible ; in fine, nothing to do but remain shut up, thinking how lovely June is in these regions, and how dull and dreary this confinement has become. Over nine months held in bondage. Thus far in the month our prospect is not very promising. If we are to judge of the future by the past, very little can be said that is favorable ; but fortunately experience of others in other Arctic wastes has demonstrated how quickly changes take place, and how little can be judged of the morrow by to-day.

June 11th, Friday. — Another day of gloomy, unpleasant weather, a drift to N. N. E. being indicated by the lead line. A drift this way is a welcome change to our going backward. Thick fog or impenetrable snow falls so soft that it melts on touching the floe, thus depriving us of the satisfaction of getting drinking water from it, whereby we might put our distiller out of commission and save one hundred pounds of coal a day.

June 12th, Saturday. — These are, I think, our gloomiest days, not alone because of the unpleasant weather, but because of the continued disappointment, hour after hour, at a time when we have some reason to hope for a release. Before many days the sun will have got his furthest north, and will commence going south again, and that in itself is not a comforting circumstance. Though the ice is visibly wasting on the surface, and is sloppy and in places ankle deep in water, there is enough that is firm and solid below to hold us fast, and prevent lanes or openings. This chasséeing around

before varying winds will perhaps bring us up near where we started, but it may also have the effect of shaking up the ice and cracking it, in which case the present temperature will prevent a re-freezing, and perhaps facilitate the making of a lane by which we can move.

June 13th, Sunday. — The general gloominess is somewhat alleviated by the getting of observations for position, whereby I determine we are in latitude $74^{\circ} 3' 46''$ N., longitude $176^{\circ} 53' 45''$ E., and have drifted since the 9th instant thirteen miles to N. 69° W. Not encouraging, either for the Pole or the N. W. Passage; but *quien sabe?*

At ten inspected the ship, finding everything neat, clean, and orderly. Divine service followed. Jack captured a young fox. Turned it over to naturalist.

June 14th, Monday. — Mr. Collins was added to our sick-list last evening, — an attack of indigestion, or something of that kind, which is not serious enough for alarm. Danenhower's case remains the same, and the doctor tells me nothing more can be done for him until our return to the United States. To bring about any change in his condition a very severe operation is necessary, and in our circumstances such an operation is not to be resorted to. Besides proper instruments, the surgeon ought to have an assistant, and the subsequent treatment of the patient requires the conveniences and appliances which a hospital alone can furnish. So far as the purposes of this expedition are concerned, Danenhower may be counted out entirely; and my plans and operations are therefore to be made without his assistance or coöperation.

All sorts of weather to-day, — sometimes a little blue sky, oftener overcast, a little fog, a little snow, and

some squalls. We are engaged in painting the ship outside, a curious spectacle in the ice-pack, and shall look as neat and trim ere long as if we were at anchor in a snug harbor. Our boats are also being painted, getting their share of the general "tarring" up.

June 15th, Tuesday.—Much water-sky all around horizon, and from aloft we can see ponds here and there at long intervals.

June 16th, Wednesday.—Observations to-day place us in $73^{\circ} 40' 54''$ N., and $177^{\circ} 18' 15''$ E., showing that we have drifted since yesterday thirteen miles to S. 18° E. This is the hardest blow of all, and difficult to stand up under. Are we never to have a change? Our soundings to-day are in twenty-five fathoms, so I suppose we are drifting towards some shoal on which our ice-field may bring up. I am too disgusted to make any more remarks on such a miserably resulting day.

June 17th, Thursday.—Observations to-day place us in $73^{\circ} 33' 41''$ N., and $177^{\circ} 27' 15''$ E., showing a drift since yesterday of 7.7 miles to S. 21° E.

The work of painting goes on as if we were in a harbor with other ships to look at us, instead of being hard fast in the ice many hundred miles away from the rest of humanity. At all events we can admire the result of our own labor.

June 18th, Friday.—Our daily monotony is very depressing. Over nine months have we been held fast and drifted here and there at the will of the winds. So long as the temperature gave no chance for a change, no one expected it, and we cheerfully accepted the inevitable. When during the month of May we steadily drifted to the northward and westward we were nearly as well pleased as if we had had a lane to move the ship along in, for we were advancing. Since the 4th

instant, however, we have been as steadily going back, and to-day we are very nearly in the same latitude we reached a month ago, and about fifteen miles W. of our old track, going on "backward in our flight." Here then, so far as we can judge, is a month lost, and worse than lost, for we have got into shallower water where but little wave action can or will take place to break up the field which surrounds us. Water-sky in abundance indicates some ponds, if no larger opening; though as they change positions daily, no very considerable opening can have occurred. In our immediate vicinity where the water pumped from the ship froze over the old ice, the crust is thawing and forming ponds. This makes our walking uncertain, for without warning one is apt to break through and be in water over his knees. As all around the ship ashes and refuse have been spread, presenting a black surface, the ice underneath rapidly melts, and by the careful attentions of Melville, Dunbar, and the doctor, the resulting water is led by canals to the ditch, where, by its warmth, say 30° , it honey-combs the heavier ice beneath. By the wasting of the ice the ship is more uncovered, and within a day or two we have noticed that she has come up, "cradle and all," about four inches, as indicated by the falling of the water-level on her doubling. Every day Mr. Dunbar and the men are out on the hunt, and occasionally a seal is brought in, in tow of the dogs, as the result. All bears seem to have disappeared, not a single track having been seen for some days. They evidently have gone to the land, where the breeding season affords them more attractive food than seal meat at rare intervals.

June 19th, Saturday. — Observations to-day show a drift to S. 47° E. seven miles. That our drift is not

greater is remarkable, for, in the past twenty-four hours we have had N. W. winds, with velocities ranging from sixteen to twenty-four miles an hour. However, our field may have brought up, and though we are deepening our water again to twenty-three and a half fathoms, it may be that we are being edged off, as the ice grinds on the shoal. Otherwise the day is without interest. Puffy, squally weather and occasional snow flurries go to make up a June day in these latitudes.

June 20th, Sunday. — Another week has come and gone and we are in the same place. Instead of repining at not advancing, I suppose I ought to be grateful that I have a ship to hold us together, but weak human nature crops out occasionally.

At ten I inspected the ship, finding everything in good condition, and shining with the coat of paint that has been applied. Then divine service was performed in the cabin. Newcomb, while out to-day, found a dozen mosquitoes. Carefully did he bring them to the ship as trophies. They were, when found on the snow, dull and sluggish, as if blown a long distance by the wind.

June 21st, Monday. — The advent and departure of another day to record ; and except that it is the longest day in the year to some people (though not of course to us, since we have the sun the whole twenty-four hours), it is hardly worth recording. Observations show us that we have drifted, since the 19th, eleven and three tenths miles to S. 68° E. Discouraging, very. And yet my motto is, "Hope on, hope ever." A very good one it is when one's surroundings are more natural than ours ; but situated as we are it is better in the abstract than in realization. There can be no greater wear and tear on a man's mind and patience than this life in

the pack. The absolute monotony ; the unchanging round of hours ; the awakening to the same things and the same conditions that one saw just before losing one's self in sleep ; the same faces ; the same dogs ; the same ice ; the same conviction that to-morrow will be exactly the same as to-day, if not more disagreeable ; the absolute impotence to do anything, to go anywhere, or to change one's situation an iota ; the realization that food is being consumed and fuel burned with no valuable result, beyond sustaining life ; the knowledge that nothing has been accomplished thus far to save this expedition from being denominated an utter failure ; all these things crowd in with irresistible force on my reasoning powers each night as I sit down to reflect upon the events of the day, and but for some still small voice within me that tells me this can hardly be the ending of all my labor and zeal, I should be tempted to despair.

All our books are read, our stories related ; our games of chess, cards, and checkers long since discontinued. When we assemble in the morning at breakfast we make daily a fresh start. Any dreams, amusing or peculiar, are related and laughed over. Theories as to whether we shall eventually drift N. E. or N. W. are brought forward and discussed. Seals' livers as a change of diet are pronounced a success. The temperature of the morning watch is inquired into, the direction and velocity of the wind, and if it is snowing (as it generally is) we call it a "fine summer day." After breakfast we smoke. Chipp gets a sounding and announces a drift E. S. E. or S. E., as the case may be. We growl thereat. Dunbar and Alexey go off for seals with as many dogs as do not run away from them *en route*. The doctor examines Danenhower and Iver-

sen, his two chronic patients. Melville draws a little for this journal, sings a little, and stirs everybody up to a realization that it is daytime. Danenhower talks incessantly — on any or all subjects, with or without an audience. The doctor moralizes between observations; I smoke; Mr. Newcomb makes his preparations for dredging specimens; Mr. Collins has not appeared, his usual hour being 12.30 in the afternoon. Meanwhile, the men have been set at work; a sled and dogs are dispatched for the day's snow for washing purposes. The decks are cleared up, soundings made, berth deck inspected, and work of painting, scraping, or whatever is on hand commenced. The day's rations are served out to the cook, and then we commence to drift out on the ice to dig ditches, to look at the dogs, calculate the waste in the ice since yesterday, and the probable amount by to-morrow. The dredge is lowered and hauled. I get the sun at meridian, and we go to dinner. After dinner more smoke, more drawing, more singing, more talk, more ditch and canal-making, more hunting, more work, more dog inspection, and some attempts at napping until four P. M., when we are all around for anything that may turn up. At 5.30 time and azimuth sight, post position in cabin, make chart, go to supper at six, and discuss our drift, and then smoke, talk, and general kill-time occupations until ten P. M., when the day is ended. The noise subsides; those who can, go to bed; I write the log and my journal, make the observations for meteorology until midnight. Mr. Collins succeeds me four hours, Chipp him four hours, the doctor next four hours, Mr. Collins next six hours, I next two hours, Melville next two hours, and I end the day again, and so it goes.

Our meals necessarily have a sameness. Canned

meats, salt beef, salt pork, and bear meat have the same taste at one time as another. Each day has its bill of fare, but after varying it every day for a week we have, of course, to commence over again. Consequently we have it by heart, and know what we are going to eat before we sit down at table. Sometimes the steward startles us with a potato salad (potatoes now rotting too fast for our consumption), or a seal's liver, or a bear's tongue; but we generally are not disturbed in that way. Our bill of fare is ample and good, our water is absolutely pure, and our fresh bread is something marvelous. Though disappointed day after day we are cheerful and healthy, and — here we are.

Everything looks unsettled about the weather to-day. We have some squalls, a little rain, a little snow, a little mist, plenty of water-sky, and, alas, plenty of ice. The temperature ranges between 33° and 30° .

June 22d, Tuesday. — As a finishing touch to our cleaning house we to-day blacked down the rigging. Mr. Newcomb shot and secured a beautiful Ross gull, which from its rarity is quite a prize. This makes the third of this species that he has secured, two last fall and one to-day.

June 23d, Wednesday. — Ross gulls are by no means rare with us, however rare they may be in other parts of the world, for to-day Aneguin shot another one and brought him in, making four in our collection. Our bear meat beginning to run low, we have set to work accumulating seals, not only for the dogs but for our own possible food, and I am much pleased to find that we have now twenty-seven on hand. Every day hunting parties are out bringing in one or two. Thus far we bury the seals in the snow to preserve them from the heat (?) of the sun, which will, of course, last

only as long as we are held fast. When we move, I suppose we must utilize some empty space in the coal bunkers as a stow place for the carcasses. For some reason we see no walruses. The amount of bright sunlight we have had since the temperature has been pleasant has not been sufficient, perhaps, to induce the walruses to come out and bask in it. This month has been an eminently unpleasant one, for though the temperature has been comparatively high, say 32° , so much moisture has been contained in the air as to make us always chilly. The thawing on the surface of the floe has kept everything sloppy, some places being an inch deep and more in water. Under such circumstances moccasins are of no use; rubber boots for steady wear are crippling to the feet, and we are compelled to fall back upon leather boots, which, though kept impervious to water by constant greasing, make our feet cold and uncomfortable. My plan is to wear my boots only when in the main cabin or on the ice; as soon as I come into my own room I put on a pair of bird-skin slippers which Mr. Dunbar made for me, and which are as warm as can be desired.

Owing to the accumulation of ashes and rubbish around the ship, the ice in that locality is rapidly wasting, and in consequence more and more of the ship's hull is being uncovered. Besides this there is a wasting going on in the ice-cradle which holds her, and this relief of so much weight allows her to rise more nearly to her proper flotation. This we see indicated by the daily difference of the water-level, and it averages nearly an inch a day. In an idle moment I appointed the 4th of July, the anniversary of the Jeannette's christening, as the time when she would again be afloat and under way, and I shall be the happiest man north

of the Arctic Circle if such proves the case. Since our supply of snow begins to be difficult of access on account of the sloppy condition of the ice which makes sledding bad, we to-day filled our tank on the spar deck with the water from the pools. The temperature is sufficient to prevent accident to our tank by any freezing.

The dismal monotony of our daily existence still continues, and while our drift is southward ho! our social barometer is kept correspondingly low. The only animate creatures in whom I detect no change are the dogs. They seem perfectly oblivious to all surroundings, utterly indifferent whether the sun shines or does not shine, so long as they are fed. From the liberal diet of bear meat and seals' entrails they have remained as fat as dumplings, and repudiate utterly any labor or exertion. When with the sunshine the temperature reaches 32° , it is amusing to see them pant, and seek shady places, while we human beings are merely comfortable. However, their heat has a better non-conductor than ours.

June 24th, Thursday. — A day without anything in particular to record.

June 25th, Friday. — This day is worthy of record as bringing another Ross gull, shot by Aneguin, and no less than nine seals. Besides this Aneguin saw and shot his last cartridge into a young bear, but the animal, though bleeding freely, took to the water and escaped. The "water" referred to is the long lane about one and a half miles S. E. of the ship, which is daily visited by seal hunters. Thermometer is generally at 31° and 32° , but at three P. M. it was 37.5° . Oh, if we could have it at 100° for a week to melt this ice rapidly! That some melting is going on beneath is

shown by the water-level going steadily down on the ship's side, the weight holding her down becoming less. We now have the sea-level at nine feet seven and a half inches forward.

June 26th, Saturday. — A drift of eight miles N. 85° W. Thus it goes, east one day, west the next, north one week, south the next. When will this come to an end? Twenty-four fathoms soundings, W. S. W. drift, also encouraging, very! An opening ten feet wide occurred in the ice half way to the old opening one and a half miles S. E. of the ship. Much water-sky in all directions.

June 27th, Sunday. — At ten A. M. made my usual Sunday inspection, and read divine service thereafter in the cabin. From the crow's-nest we can see that we are in the centre of an ice island, a lane of water in some places a quarter of a mile wide surrounding us at a distance of a mile. This would show that the ice does sometimes open in these latitudes, a fact which I had begun to doubt hitherto.

June 28th, Monday. — Mr. Dunbar started out this morning with the dingy to go ducking, intending to go to the lane of water about one mile N. W. of us, and try luck. He came back about four P. M. with thirteen ducks, and informed me that he followed the lane (which he thought ran north) for nearly fifteen miles without coming to its end. The ice on each side (at times two thirds of a mile wide) was very old and heavy, five and six feet out of water, and so deep under water that he could not see the bottom of it. I began to look upon this as an avenue of escape, and ran over in my mind how I could get the ship through the mile of intervening ice into the lane and push on for something. But I need not have exercised my slumbering brain

tissue, for toward midnight the lane commenced to close, and I had the melancholy satisfaction of realizing that had the ship been there she would in all probability have had a fine squeezing.

We find that the amount of water coming into the ship forward is decreasing quite sensibly, for we do not have to run our windmill nearly as much as formerly. The leak, or supposed leak aft, has stopped altogether. The ice right around us is wasting very fast, and we still continue to rise, bringing our cradle with us. To-day the water-line is at nine feet four inches on our stem. We are heeling 4° to starboard (3° all winter), and our doubling on the starboard side is about four inches above the water. The surface of our floe is dotted here and there with small lakes, which enable us to get water readily for our tank, and present so many excellent laundries for washing clothes. How disgusting it is to see ice form on the surface of our little lakes at the end of June.

June 29th, Tuesday. — An uneventful day. We have drifted since yesterday three miles to S. 31° E. Not very encouraging, but still I hope on, hope ever. The lane of open water which Mr. Dunbar followed up for fifteen miles yesterday has closed again to-day, its general direction being indicated by disconnected small ponds here and there. The ship is still rising, the water-level being now at nine feet on the stem.

June 30th, Wednesday. — The month of June comes to an end, and leaves us, I am sorry to say, fifty miles S. 9° E. of where we were at its commencement. We are, in fact, no further north than we were between May 16th and 17th, and may be said to have accomplished nothing in six weeks — both cheerful and encouraging! Our position to-day is in $72^{\circ} 19' 41''$ N., and $178^{\circ} 27' 30'$

E., and we have gone since yesterday S. 52° E. the enormous distance of one mile! I am almost disgusted beyond redemption. To stand still would be bad enough, but to go backward is worse. To-day I had to inflict the first punishment of the cruise on Boyd, fireman, giving him watch and watch for twenty-four hours in the fire-room, for profane and abusive language to a shipmate. A magnificent day for weather, — a temperature of 41° at two P. M., and 34° at midnight. Not a cloud from noon to midnight. Mr. Dunbar took the dingy out to the long lead to-day, but found it all closed up. No ducks, therefore, were brought back, but a Ross gull, which, though quite rare in Europe and America, is with us a drug almost, for we have seven.

July 1st, Thursday. — We commenced a new month with bright, pleasant weather, and almost cloudless sky, light southerly wind, and a temperature ranging from 33° to 38° . And as an encouraging fact, our sights show that we have drifted since yesterday two miles to N. 40° E. Let us hope that it is the beginning of a new era, and that we are now going to advance and no longer retreat. Nearly ten months held fast in the ice, but yet we are all here, and with two exceptions in good health. Danenhower drags along in as uncertain a condition as ever. Of late his eye has been accumulating trouble and begun to affect its mate, and the doctor has been compelled to cut and probe again daily as he did early in the winter. Though Danenhower stands the trial well, as far as his general health is concerned, I fear he may not be able to stand the wear and tear of another winter in the pack if we are unfortunate enough to have to endure it. He is, of course, very thin and bleached from his long confinement, but seems always bright and cheerful, and speaks of getting back to duty

in a short time, which, of course, I know to be out of the question. Our other sick man, Iversen, seems to be improving, only occasionally breaking out into hysterical weeping, etc.; but his gloomy ideas of being watched and a mutiny, etc., seem to have subsided.

Our coal account shows that we have remaining fifty-six and one half tons. At all hazards I must retain thirty tons for keeping us warm and cooking and distilling next winter, so that I have just twenty-six tons that could be devoted to steaming in case I had a fair chance to accomplish anything. As our consumption per diem in steaming would be at least five tons, I have in round numbers five days' steaming. And with this I have to make the Pole, accomplish the N. W. Passage, or go back empty handed. What an ending the last would be compared with our beginning, — the yachts, the fort's salute, etc., etc. It makes my heart sick to think of it. What a return for the expenditure of money! What a realization of all my fond dreams and hopes!

To-day our men dug away the ice under and around our propeller well, hoping for a time soon to come when we can get the screw up and have a look at it. We still rise slowly, but there is yet a large mass clinging to us. Melville tried the other day to turn the screw shaft by jacking, but it was held too rigidly.

July 2d, Friday. — Another uneventful day, and such gloriously beautiful weather that our enforced idleness becomes terrible. A temperature ranging from 34° to 46.4° and back to 32°, and ponds here and there to mock us with water that is too little for navigation and too salt for drinking — at all these we stand and look, and see one day more pass by without our having done a thing that is to our credit.

July 3d, Saturday. — The amount of water finding its way into the fore peak has become very small, and within the last week or two just a small stream running over the floors. But to-day even that small amount has ceased, and the fore peak and flour-room are both as dry as a bone. The amount of water lodging in the fire-room bilge is correspondingly small. We have been accustomed to let about five inches accumulate, in order to have a convenient feed for our distilling apparatus, running the windmill, or pumping by hand, when that depth has been increased. The light airs and calms of the past day or two have necessitated the use of the quarter deck bilge-pump, and I have remarked that a dozen strokes or so each hour have caused it to “suck.” The melting of the surface ice around us has so much decreased the mass of ice surrounding the ship that it has been buoyed up by the water bringing the ship with it, and to-day the water-level is at a height, or perhaps more properly depth, of eight feet seven inches on our stem.

The decrease of the leak is pleasant enough, though of course I can assign no satisfactory reason. The change from 3,663 gallons per hour to a dozen strokes of a hand bilge-pump is too remarkable to be mentioned casually. The change has been gradual, and inexplicable beyond a certain extent. The settling down and hardening of the oatmeal, white lead, oakum, etc., between the frames may have caused a partial barrier to the entrance of the water, and the raising of the ship and ice out of the water, and so diminishing the height of the water head, may have so decreased the pressure as to make that barrier effectual. As no water flows into the fore peak, this seems to follow naturally, and the small accumulation in the fire-room may proceed

from some other source yet undiscovered. Small as it is, it will not occasion us much uneasiness. I am unable to get under the coal bunkers, because of the fifty-six odd tons of coal there remaining, and the impracticability of attempting to remove it while I am daily hoping for a breaking up of the ice and a resumption of our voyage.

We have dug away all the ice we could get at under the stern, in the hope of liberating our screw in order to trice it up for examination. But enough ice remains under water to hold it firmly. Leaning 3° or 4° to starboard, the port side of our ship looms up like a frigate, and at a little distance we stand, seemingly, on top of the ice. Drawing but eight feet seven inches forward, and twelve feet aft, gives us a very "down at heel" look, and makes me wonder what we shall really draw when the ice-cradle breaks up under us and lets us down to our line of flotation.

Our daily expenditure of fuel amounts to one hundred and seventy pounds. (One hundred and ten pounds for the galley and sixty for distilling.) I am very much in hope that the distilling may soon be discontinued; for the doctor, who has been carefully watching and experimenting with the melting ice hummocks and the ponds, informs me to-day that, though the ponds are too salt for use, the surfaces of the hummocks give water containing only two grains of chlorine. Accordingly on Monday we shall commence collecting surface ice in barrels, thawing the same and testing the resulting water, and accumulate a tankful if possible, thus relieving the distiller, and saving sixty pounds coal per diem.

The little ponds in our neighborhood have been freezing every night at midnight with the thermometer at

30° and 31°, thus indicating the comparative freshness of their waters. In the daytime our dogs drink freely from these ponds, and our men use them as convenient washing-places for clothes. To-day an amusing sight was presented by a wash-tub, wash-board and all, on the ice, and the nautical performer as earnestly engaged in his laundry as if no such thing as ice or a ship was within a thousand miles.

To-day we ate the last of our bear meat, that good and solid addition to our food during the many months we have been in the ice. Having upward of forty seals, we shall now occasionally fall back on them for a change in our bill of fare. Yesterday we had ducks for dinner in the cabin, the result of Mr. Dunbar's hunt the other day; to-day we had bear fore and aft, and to-morrow all hands will try seal. Our position to-day is in latitude 73° 24' 13" N., and longitude 178° 34' E., having drifted since yesterday the stupendous distance of one and four tenths miles N. 27° W. Anything, however, so long as it is not south. Weather bright and pleasant; brilliant sunshine for the whole twenty-four hours makes me deplore our inability to devote it to accomplishing some good and useful purpose.

July 4th, Sunday. — In reality this is Monday, July 5th, because we have crossed the 180th meridian, and should have changed our date; but as I hope to get east again this summer, I have seen fit to keep the old reckoning. A year ago to-day we were in San Francisco, and received a visit from Lord Loftus, while on his way to Sydney, as Governor of New South Wales. At dinner to-day we recalled that event. Ah, well! who can tell what a year will bring forth. We certainly have not realized our anticipations by long odds; and I see in the faces round about me no hope of so doing.

Stuck in the ice — mired, in fact, at $73^{\circ} 24' N.$, it is hard to hope that we shall make any record worth comparing with any other. Being the first Sunday in the month, we had, of course, the Articles of War and general muster preceding my inspection and divine service.

July 5th, Monday. — Celebrated the anniversary of American Independence by dressing ship with ensigns at mast-heads, and signals in a rainbow; and I hope American Independence will feel sufficiently complimented by its celebration in this place for the first time. The weather prevented me from determining the exact spot of the celebration by observations. The latitude, $73^{\circ} 26' 7'' N.$, is all I could get. Thick fog and a searching mist made a wretched day. The flags were all covered with rime and frost when hauled down, and will need several days' good sunning to be dried.

July 6th, Tuesday. — All our time and attention were occupied to-day in collecting surface ice and thawing the same in our water tank for drinking and cooking purposes. The greatest care was exercised in the selection of the ice; but occasionally some would prove to have been dug too deeply, and would give so much salt in its resulting fluid as to require rejection. As a general rule, the soft snow-like surface crust was sufficiently fresh to make a potable element; but if by accident or carelessness the spade struck into the underlying ice, a salty solution was the result. Dr. Ambler and Chipp watched the matter closely and faithfully, repeated tests being made of each barrellful of snow before emptying it into the tank; and I am satisfied that every precaution was taken to provide a sufficiently pure element. The change from distilled water to melted ice is a bold experiment, and only warranted by

our zeal to save every pound of coal we can for possible steaming this summer, or keeping us warm next winter. To quicken the process of thawing, a steam-pipe was led from the steam-cutter's boiler into the tank on the spar deck, and the steam driven into the tank through it. As our tank holds four hundred gallons, I am anxious to accumulate that quantity rapidly, and shut down on all consumption of fuel, except for the galley, as speedily as possible. Parties going out to hunt return with the news that the ship is in the centre of an island of ice about two and one half miles in diameter, with a narrow canal running around it.

July 7th, Wednesday. — We succeeded in getting our tank filled to-day with a sufficiently pure water from melted surface ice, and I accordingly directed the distilling to be stopped. Thus we save sixty pounds of coal per diem, and give a rest to our engineer's department, which has been steadily employed in night and day watches all the winter and spring; in fact, upon the firemen and coal-heavers has fallen most of the uncomfortable toil, for whether in distilling, or running steam-pumps, or repairing, they have not had an all-night in since November.

Such little pumping as is required, about a dozen strokes every two hours, is done by the man on watch for the time being, and we have now little beyond the ship's routine, except watching and waiting for an opening in the ice that will let us free.

Nowhere in my life have I experienced or felt such a perfect silence as prevails in these icy wastes when the wind dies away. It is positively maddening. After ten P. M., when all noise ceases on board ship, and the dogs are dozing away on ash heaps and dirty spots around her, one standing a little distance apart and

looking at the surroundings would feel inclined to believe that no life existed but his own. On such occasions I go a little distance off and ruminate over our past, and wonder as to our future ; but to-night the silence was so painful as to easily induce me to go back to the cabin where my own kind could be seen and their voices heard.

The running of the water over the floes in long lanes has made regular sluice ways through which the meltings run to find the sea-level. Our old sounding hole, about one hundred yards on the starboard quarter, offers an access to the sea, and several streams have scoured a way or had a way made for them. This running water has wasted the ice away until at the edges of the hole it is but two feet thick, and covered with six inches of water swirling about like a maelstrom. Through this we can see the seeming black cavern below, and in the monotony which hangs around us I almost feel tempted to jump down it to see where it goes to.

July 8th, Thursday. — I have hereinbefore mentioned that the greatest thickness of a single floe seen by us was seven feet ten inches, or say roughly eight feet. When, after ramming the ship through forty miles of leads last September, she was finally brought up, I pushed her into a crevice between two heavy floes which we subsequently found to be thirteen feet in thickness. I think this great depth was caused by the overriding of one floe on another, and regelation under pressure having taken place, the two became united as one mass. Mr. Dunbar, in his several tramps, has met ice which he describes as “so deep that you could now see how deep it was.” This being rather vague, I directed him to-day to take with him a line,

with hook attached, to catch under these floes, and thus give a measure of their thickness. Upon his return he reports that he measured floes ten and twelve feet thick, and some fourteen and fifteen feet thick, and the surface was "from a foot to eighteen inches above the water." It is, of course, impossible that such thicknesses should be ascribed to any one single floe. I am satisfied that when water has frozen to a thickness of eight feet the ice forms a blanket which effectually prevents the radiation of heat from the water beneath, and thus makes further freezing impossible. Any further thickness is due to deposits of snow on the surface, or the shoving under of another floe and a union by regelation between the two. When, last November, we were squeezed out of our icy bed and pushed out into water, we were as truly floating for a time as if in mid-ocean. The next day, however, we were iced in. This freezing continued from November 28th to January 17th, by which latter date the ice had a thickness of forty-eight inches (four feet). Subsequent measurements were rendered impossible by the smash up of the 19th of January, when floes so overrode and underrode our surrounding ice as to jumble it all in a heap. When we commenced to dig a canal around the ship we dug through four feet of ice before the water flowed in on us, but that depth was due to piling up, of course, and not to any direct freezing. As our leak has almost altogether subsided, it is safe to assume that we are buoyed up by a floe of ice extending down and under the keel, which floe, being lightened by its surface thawing under the ashes and refuse we had spread around us, is enabled to float so much higher. One of these days, let us hope, this mass will break and let us down to our bearings.

July 9th, Friday. — The events of the day may be summed up in a few words. Our position shows a drift of one mile to S. 24° E. Encouraging, very. We loose sails for the first time in over ten months, and find them just as good as they were the day they were last furled.

July 10th, Saturday. — A day of almost steady rain and fog, and, to my sensation, more disagreeable in temperature than the coldest weather of winter. The thermometer ranged between 30° and 34.5° , but the dampness and moisture seemed to pierce to the bone and marrow.

July 11th, Sunday. — I succeeded in establishing our position to-day in latitude $73^{\circ} 38'$ N., longitude $177^{\circ} 59' 30''$ E., showing a drift since the 9th of one and four tenths miles to N. 68° E. This seems to be worse and worse, for at this rate before many days we shall stand absolutely still. It is awfully discouraging to wait a couple of days for a sight of the sun (and hope, meanwhile, that you are drifting in some decent manner), and find at last that you have moved a mile. Had the usual Sunday inspection, followed by divine service.

Since the distilling has ceased we light a wood fire in the galley each evening to boil the tea water. Our empty barrels and boxes have accumulated largely, so we have quite a supply to fall back upon for occasional fires instead of using coal.

July 13th, Tuesday. — Observations to-day show a drift since yesterday of three and seven tenths miles to N. 13° W. We seem to be coming up slowly, ice and all, as indicated by the gradual falling of the water-level on our hull. Heeling 5° to starboard still, and that is also slightly increasing. Of course I cannot say

when this will stop. In order to get an idea of the correct thickness of the ice in our neighborhood (in case subsequent emergency should make it advisable to dig or saw out a dock, if possible, and make an effort to drag the ship into it), I directed Chipp to make borings, and he reports, as far as can be made out, the situation as follows : —

The ship is held firmly by a cradle of ice which, from the mainmast aft, averages five feet in thickness. (Under the stem it is five feet four inches thick below the surface of the water.) From ahead to the mainmast, about, there is a second floe piece which shoved under the first floe on January 19th.

Thickness of ice below the surface of the water : —

Under the stem	5 ft. 4 in.
50 ft. astern	4 ft. 3 in.
100 ft. astern	4 ft. 3 in.
150 ft. astern	5 ft. 0 in.
250 yds. starboard quarter	5 ft. 0 in.

The ice as a general thing has its surface about four inches above the level of the water. This is what is left of the direct freezing since November 30, 1879, of course thawing having taken place on the surface by reason of the sun's rays, and underneath by action of the warmth of the water, say 34°.

In company with Melville and Dunbar I walked one of Mr. Dunbar's mile estimates (about two and a half miles in fact) to the S. E., where there has been an opening affording seal shooting. In a straight line, as a bird would fly, it is about one and a quarter miles distant, the increased amount being caused by necessary detours, to go around small ponds which one cannot jump over, and which are in places over one's boot-tops in depth. These are, of course, formed from surface

thawing. Arrived at the "open water" it proved to be nearly closed, a width of six feet only allowing a look down in the depths below. The ice seemed to be about four feet in thickness, but looking only was very deceptive. In this precious lane there floated a broken portion of the floe, and anxious to realize the sensation of being under way again I embarked on it and pushed myself across. Near the old opening there was considerable dirty ice, with shells and small pebbles, showing that this ice had been on the bottom, or had rubbed along the land, or (query?) was it refuse matter left on it by a walrus? Near by we found a log of birch (?), heavy from water soaking, but sound and fresh at the fractured end. Not being able to bring it in we stuck it up in a hummock, that some men might let their dogs drag it in to-morrow. We started with three dogs, but not liking to wet their feet they ran away from us and returned to the ship.

July 14th, Wednesday. — Having great difficulty in getting any work out of our "hoodlum gang," Jack, Tom, and Wolf, a method of punishment had to be devised. Ordinarily they lie around on ash-heaps all day in the sun, blinking lazily, and ready to head an attack on some wandering dog in search of a bone, or more particularly sallying out to meet some dog returning with the hunters, who has incurred their grave displeasure by assisting at any work. The sight of a harness, merely, reminds them of a pressing engagement elsewhere; and the moving of a dog sled in their range of vision seems suggestive of the advisability of a change of base. Accordingly, each morning, when the ice has to be dragged in for melting, these three are occupied in surveying the work from a distance until it is completed, and then they unite in an attack

on those who did the dragging. They were caught by strategy to-day, however, and harnessed up; but Tom slipped his harness quietly and bolted, while Wolf chewed his through and escaped. When caught they were securely tied to a rope over the stern, and kept there until ten P. M., when, in order that their howls might not keep everybody awake, they were anchored with an ice-claw some distance off. This disgusted them. Tom took his punishment solemnly and quietly, but Wolf yelled incessantly, so much so, that Tom got provoked and thrashed him twice into silence.

Position to-day, latitude N. $73^{\circ} 42' 50''$, longitude E. $178^{\circ} 1'$, showing a drift since yesterday of three and two tenths miles due E. Much fog and mist, and occasional drizzling rain, throughout the day. About one and a fourth miles N. W. of the ship there is a lane of water one fourth mile in width, and extending W. Mr. Dunbar plans going to it to-morrow and cruising on it in our skin boat. This is the baidera received at St. Michael's, which was originally forty feet long, but we have cut it down to about twenty-five feet, making it more portable, and when not in use easily hoisted under our cutter.

July 15th, Thursday. — Mr. Dunbar started out this morning, but soon returned, having found the lead of yesterday all closed up. Thus do things change in this part of the world. We made the discovery this morning that the ship had come up one inch forward, and gone down an inch aft, caused probably by the encrading underlying ice having melted sufficiently to change the point of support farther forward. It will give us something to watch from day to day.

The forenoon gave us very fine weather. At noon I got the latitude, showing, I am sorry to say, a small

southing. At two o'clock the sky became overcast, and from that time to midnight we had rain, mist, and thick fog. Although no material change occurred in the temperature (at midnight it was 32°), the sensation of cold was increased about 100 per cent. The mist, fog, and rain seemed to penetrate to one's marrow in the most aggravating manner, and reminded him forcibly of the warmer times we have been accustomed to at home, where no doubt this afternoon our friends have been suffering from heat and sighing for ice and the shade.

And thus, with our routine of eating, drinking, and sleeping, hourly weather observations, and the work of the ship, the day comes to an end, and, in the language of Mr. Wilfer, we can exclaim, "Another one of them gone."

July 16th, Friday. — Our observations to-day show a drift since the 14th of nine miles to S. 43° E. Rather discouraging as to direction, but hopeful as showing a loose condition of the ice, which admits of our readily moving in compliance with the wind. The open water (*i. e.* a crack in the ice), one and a half miles S. E. of the ship, has widened somewhat, and beyond it the ice seems broken up in large blocks, though from their uneven surfaces we cannot tell for how great a distance this broken condition extends.

While Mr. Dunbar and Alexey were out to-day, the latter shot a seal, and apparently killed it, as it lay stretched out on the ice. It was, however, only stunned, for, as Alexey approached it, it made for the water. Quickening his steps he reached it in time to grab it by the hind flipper, in an effort to hold it. But Mr. Seal was too sharp for Alexey, and managed to wriggle out of his grasp.

This seems to be the time for shedding the coat, as all our captures are made while the seal is out of water, getting rid of his old coat by friction on the ice. But they are rare in this neighborhood, for some reason or other. Had the spruce (?) log brought in which we found the other day.

July 17th, Saturday. — A day of not much interest. Much fog, mist, and rain prevailed, and during the afternoon snow fell. This is a nice showing for the 17th day of July, indeed. So slack does the ice seem, that a shift of wind is immediately noticeable in our change of drift.

July 18th, Sunday. — Another week has come and gone, and here we are yet held in bondage. This kind of life is most discouraging. If we were only drifting toward our goal, we would be somewhat content; but alas! we are steadily drifting away from it: or, if in our enforced idleness we were accomplishing anything for the good of science or human nature, it would be a comfort, — but instead of either we are simply burning coal to cook food to consume day after day. Over ten months of this imprisonment have we had, and in fact were it not that a certain indefinable, and I confess inexplicable something, keeps telling me all will come out right yet, I could hardly assign any reason why it should not last any multiple of ten months more. Currents there are none, except such as are created locally and temporarily by a wind. See-saw, see-saw N. W. with a S. E. wind, and then S. E. with a N. W. wind, and the same result with any other two succeeding winds. The surface water shows no increase of temperature that is not due to the air, and the bottom water has a temperature of 30°. Inspected the ship and read divine service, thus, as it were, making the

mark that distinguishes Sunday from other days in this part of the world as well as in other parts.

July 19th, Monday. — I cannot help thinking, as I turn over a new leaf and commence a fresh page, that I am wasting stationery in keeping a daily record of so unimportant matter as our daily life. Each night I am forced to admit that another day of our short season is slipping away without any result worthy of the spirit which conceived, and the enterprise which carried into effect, this present Arctic expedition. And the realization of our utter impotence to change our fate in any way makes such an admission doubly disagreeable. A bear in a trap, a bird in a cage, a ship in the ice, are alike held in bondage sharp and galling.

Of late, when one is tempted to feel blue, the sun, which, under ordinary circumstances, induces cheerfulness, rather adds to our disgust. For as that luminary provides means of determining our position, we are informed on each occasion how far we have gone backwards; or, in other words, how much nearer we are to the South Pole and how much farther from the North Pole. To-day, for example, we get observations for the first time since the 16th, and find we have been drifting, in these three days past, thirteen and four tenths miles to S. 8° W. And this, despite the fact that we have been having W. and N. W. winds. Job is recorded to have had many trials and tribulations which he bore with wonderful patience; but so far as is known he was never caught in pack ice and drifted S. and W. with W. winds.

Hoping to see something consoling, I took a team of dogs out to-day to the S. E., to the open lane of water; and after having been run away with twice and brought back to the ship by the dogs, I was forced to secure

the services of Alexey to get me to my destination. A white man inspires no fear among these animals. Reaching the open water I found it was about one fourth of a mile in width, enough to handle a vessel in under steam, but made a circle around the ship irregularly. I am satisfied that nearly all the ice in our neighborhood is of this last winter's formation, having frozen over the small lake into which we were squeezed out from among the heavy ice on November 25th last. The borders of our island are formed of ice of great thickness, perhaps forty feet thick, whose surfaces are about three feet above the level of the water. The ice which immediately surrounds us has an average thickness of say five feet, except where crowding, as for instance under our bows, has caused one layer to ride over or under another, making a thickness of ten or fifteen feet.

Owing to decay, the cradle of ice holding the ship is becoming specifically lighter, and buoying us up; for to-day the water-level stands at seven feet four inches forward, and eleven feet eight and a fourth inches aft. We are also slowly increasing our heel to starboard, it being now $5\frac{1}{2}^{\circ}$.

July 20th, Tuesday. — A day of no importance whatever. Desiring to learn something of the character of the ice at the borders of our island, I started at one P. M., accompanied by Melville and Dunbar and a heavy dog team. Going out to southeast, we got around to west in about two hours and a half; but as the sledging was in some places very bad over broken ice, the time was much longer than the actual distance would have required if on a level. The character of the ice is as indicated in yesterday's record, — one season's ice near the ship, and old and very heavy ice

on the borders. Excepting a very narrow lead at west going a short distance to north, I saw no way of getting out of this neighborhood, even if we were afloat and at liberty to move. As far as our floating is concerned, that must be left to time. To-day the water-level is at seven feet four inches forward, and eleven feet nine and one half inches aft, and our heel $5\frac{1}{2}^{\circ}$ to starboard.

Gloomy, disagreeable weather. Surely we must be having a backward summer to have such a state of affairs at this date. As an addition to our trophies, a branch of birch and the skull of a codfish were brought in to-day.

July 21st, Wednesday. — Temperature between 31° and 34° , making one feel cold to the marrow of the bones. I can safely say that I did not feel one half as uncomfortable during the winter, with a temperature of minus 30° , as I do now at a temperature of plus 30° . The first was a hard, dry cold, which seemed to strike but glance off, while the last is a soft, wet cold that penetrates at once.

July 22d, Thursday. — This afternoon I started out with Melville, Dunbar, Aneguin, and a dog team, to see some more of our ice-island. I succeeded, however, in getting around from west to north only, the traveling being very rough indeed. Arriving at north, I found the lane of water closing up, the five foot (one season's) ice piling up in huge slabs on some very old and heavy ice. The sight and the sound quite carried me back to our experience during the winter. As the soft state of the surfaces rendered impossible the high scream which we used to listen to, there was not much of the terror inspired; but one could not help being impressed with the tremendous force with which these

blocks were crushed along, reared up, and tumbled over, and the silent grinning "surge" with which the force continued when one would suppose it counteracted and ended. Here I was ready to turn back, having been out three hours, and being wet through from wading and being dragged through ponds too wide to go around without immensely increasing the distance.

A truly wretched day, — squally, rainy, snowy, and what not. At six A. M. Chipp required seven letters to record the state of the weather, — o. c. m. q. p. r. s., — which shows it must have been somewhat mixed.

The surface of the water stands to-day seven feet two and three fourths inches forward, and eleven feet eleven and three fourths inches aft, the ship slowly coming up forward and settling down aft. A careful calculation shows that this gradual settling is increasing the leak slightly, for we now require 317 strokes of the pump in twenty-four hours against 240 a week ago; but as both amounts are very trivial they are not worthy of serious attention. Our windmill stands ready for work whenever there is any occasion for it.

July 23d, Friday. — Fog and mist and a little snow. Are we to have no summer at all?

July 24th, Saturday. — A day as uninteresting as yesterday, and it seems a waste of ink and paper to mention it. A little rain, a little snow, and general discomfort. And worse than all, but one more month remains of an Arctic season, and here we are held as if in a vise.

July 25th, Sunday. — One week more of summer has passed and gone, and we seem nearer to another winter than to any successful result. Regularly as clock-work we perform the same duties day after day, finding each morning the same surroundings we had the day before.

The monotony of doing nothing but waiting, waiting, is very trying. If we only had land in sight anywhere, I think we would risk a journey to it. Divine service followed inspection, as is usual on Sundays. Seal at dinner, with macaroni, tomatoes, etc., etc., as per bill of fare, and a glass of sherry with our corn starch pudding. As far as food goes we are in luxury.

Got to-day our first oogook (*Phoca barbata* — *bearded seal*), shot by Aneguin. She was eight feet long, and while her flesh is valuable for dog food her skin will make boot soles.

July 26th, Monday. — An unfortunate accident occurred to-day. Alexey had been out shooting, and brought back for examination a Remington cartridge, which had failed to explode in his rifle. Sitting down quietly, without any one noticing what he was about, he placed the cartridge between the thumb and finger of his left hand while he picked away at the fulminate cap with his knife in his right hand. Suddenly the cartridge exploded, and without detaching the bullet the shell flew out into ragged edges, which cut Alexey's left hand sadly, besides badly burning it with the powder. He was at once a much demoralized native, the shock affecting him considerably. The doctor, of course, at once took hold of the patient, and nothing serious is to be anticipated, beyond deprivation of his services for some days. The chances are that Alexey will be more respectful in his dealings with ammunition.

Generally speaking, the day was as gloomy as its predecessors. An almost steady fall of light snow until nine A. M., and this is the height of summer!

Some day or other some one, myself perhaps, looking over these pages will complain of their sameness and lack of interest. The popular idea is, no doubt, that

the record of daily life in the Arctic regions should be vivid, exciting, and full of hair-breadth escapes, or enjoyable and profitable because of the acquisition of valuable information. If the popular idea is the correct one, how dull and weary and unprofitable will the record of our cruise have been! I confess to so much disappointment and mortification that I am ashamed each day to make an entry in this book, and willingly defer it to the last moments before going to bed. What can I say that has not already been said over and over again? Here we are, held fast in the ice, drifting south instead of north, powerless to change our movement an inch, hoping to-day that to-morrow will bring a change; realizing to-morrow, when it becomes "to-day," that it is the same as yesterday was; seeing a summer(?) slip by without doing anything to retrieve our reputation or make us worthy of being numbered in the list of Arctic expeditions; full of health and energy, with zeal to dare anything, and yet like captives behind bars: add all these together, as making up the sum of one's sensations and experiences, and it will be seen that the surroundings are hardly favorable to glowing narrative or absorbing tale.

So thoroughly do we feel that we are accomplishing nothing, that some of us think that the food we eat and the coal burned to cook it are utter and absolute waste. Of what avail are health and energy if we can make no use of them? In the world we are not judged by what we can do, but by what we actually perform. In the case of an Arctic expedition, judgment is passed on results and not on the zeal or intention. A ship having the North Pole for an objective point must get to the Pole, otherwise her best efforts are a failure. No matter what the difficulties, or troubles, or accidents, the

failure to do the specified thing stands out in bold letters. So with us. We started for the Pole; we are beset in the pack in 71° plus; we drift northwest; our ship is injured, and we have to burn coal to save her; we drift back southeast; we are passing our second summer more unprofitably than our first, for then we were moving. No matter how much we have endured, no matter how often we have been in jeopardy, no matter that we bring the ship and ourselves back to our starting-point, no matter if we were absent ten years instead of one, — we have failed, inasmuch as we did not reach the Pole; and we and our narratives together are thrown into the world's dreary waste-basket, and recalled and remembered only to be vilified or ridiculed.

And yet I would not wish to be understood as implying we have given up the fight. We look for to-morrow with just the same faith and with as great expectations as we did on the 1st of June. But we do not spend to-day in idleness for all that. A full meteorological record is kept, soundings are taken, the dredge is hauled, specific gravities and sea temperatures are taken, astronomical observations made and positions computed, dip and declination of the needle observed and recorded, experiments made with ice and snow and surface water, birds shot and skinned, seals hunted, mechanics employed, ship's routine carried out, etc.; everything we can do is done as faithfully, as strictly, as mathematically as if we were at the Pole itself, or the lives of millions depended on our adherence to routine. Not a word is said about going back. Occasionally a trip is proposed somewhere, — to Paris, to Naples, to the West Indies, — to come off "one of these days when we get back." We go on with the regularity of a man-of-war in port. We look upon this place — the pack

— as a kind of Key West or Aspinwall, dull as a hoe and dreary to stay in, but bound to come in sometimes in a three years' cruise in those neighborhoods. And Jack's philosophy, "It is all in a cruise, boys; the more days the more dollars," comes in well apropos.

July 27th, Tuesday. — Excellent observations to-day show us a drift of one mile south since yesterday. Light snow falls nearly all day, and the temperature rises from 26° to 30° ! Ye gods, ye gods!

July 28th, Wednesday. — A gloomy, disagreeable day, and a mile further south than yesterday.

July 29th, Thursday. — To-day becomes memorable as showing that we are again at the 180th meridian. Since the 27th we have drifted seventeen and two tenths miles to N. 84° E.

As I did not change our date when we passed to the westward of the 180th meridian on the 5th of May, no confusion of dates now occurs, although we were longer in getting to the eastward again than I had anticipated. I am glad that I did not change the date, for were we to vibrate from one side to the other an endless perplexity would follow any attempt to settle upon any particular date for an occurrence. Our great drift seems to show that the ice is slacker to the eastward of us than to the northward, for though in obedience to a strong S. and S. S. W. wind we should have gone N. or N. N. E., we have in reality gone E. and a half N. What is in store for us it is impossible to anticipate. If we have not had our summer yet, we may hope to do something next month. If our summer has come and gone, then, alas, our chances are slim. If one could see into the future how much anxiety might be spared in the present. It is very hard to realize that all our hopes and expectations should result in a weary drift

of two winters in the ice-pack, and it is difficult for a vivid imagination to see anything else if this be the warmest weather we can have this year.

Mr. Dunbar, whose duties as ice-pilot are limited to daily visits to the crow's-nest for a look at our surroundings, discovered this afternoon that a crack had occurred in the ice about half a mile north of us, and extending for a short distance east and west. Going out to examine he found it about fifty yards in extent, it being merely a separation of the old and heavy last winter's ice which surrounds us.

July 30th, Friday. — Our stiff breeze still continues. So melancholy has been our proceeding during the last two months that we welcome any change of direction as an improvement. We know that we could make nothing going N. W., and we hope we may do something going E. or N. E.

July 31st, Saturday. — The last day of the week, the last day of the month, and this page can end together. If this month is a sample of July weather here generally, I do not want to see any more of it.

August 1st, Sunday. — The new month cannot be said to open cheerfully, for we have our customary snow, rain, fog, and mist, with an overcast sky all day. At midnight we have the cheerful spectacle of salt-water freezing on the 1st of August. On the first Sunday of the month, of course, we had the usual Articles of War and general muster. Inspection and church followed.

To-day we lost one more of our dogs, "The Tease," I am sorry to say. Yesterday he appeared dull and stupid, and swollen. Being given some jalap he did not respond to treatment, but, to quote Chipp, in his account to Danenhower, "calmly passed away breath-

ing his last at three P. M." As we are of an inquiring turn of mind a post-mortem was held, Iversen acting as coroner, and it was found that the dog's death was caused by his swallowing a sharp bone, which cut through his intestines.

August 2d, Monday. — We have taken a new departure. Our position to-day I find to be in latitude N. $73^{\circ} 20'$, longitude W. $178^{\circ} 36'$, showing that we have drifted since July 29th N. 49° E. twenty-three and six tenths miles, or nearly seven miles a day. Our new departure consists in our starting off to the N. E., leaving the old backward track and going to a new part of the ocean. Though not exciting it has the air of novelty, and may prove the beginning of what, please God, will be a successful result to this hitherto valueless expedition; it is so hard to drift about in this uncertainty, while every day, nay, every hour, shortens an already too short Arctic summer. Arctic summer! have we any reason to speak of summer? Our average temperature for June was 30° , and for July 33° , and our warmest whole day thus far 38° (an ordinary cold winter day in New York). What a scampering would take place at Theodore Thomas' to-night if we exchanged temperatures with them! Four years ago to-day I was in Port Royal, S. C., with the thermometer 90° in the shade. What would I not give to have that temperature in these regions for a month or two!

About 8.30 P. M. an opening occurred in the ice about one quarter mile west of the ship, and extending for a short distance in a north and south direction, and wide enough to steam the ship in.

Our humdrum existence is occasionally varied by finding shells, pieces of sponge, or bits of wood on the ice. These are being uncovered by the gradual melt-

ing of the snow and ice, and, of course, we cannot say how long they may have remained there or how they came there originally. In the absence of facts, theories are as various as they are incongruous; in the Arctic Ocean shells may be ascribed to drift, to being brought up from the bottom by turning floes, or to being rejected by walruses in feeding. Any one will do to talk about to fill in an hour, of which, alas, we have too many idle ones.

August 3d, Tuesday. — No observations were possible to-day, for which I am very sorry, because I want to trace our progress this month very minutely. A curious occurrence is worthy of mention. Between five and eight P. M. a strong odor of burning brush-wood filled the air, and was noticed by everybody but myself, who, having a cold in the head, had no sense of smell; from six to ten P. M. a decided haze was apparent, but whether the haze and the odor of burning brush-wood can be connected in any way or not remains to be investigated hereafter. Nothing seems to come of the ice opening mentioned yesterday, and the ice in general seems to be compact again in all directions.

August 4th, Wednesday. — One more day come and gone, and nothing accomplished. This is becoming gloomy, indeed. Are we never to get the ship free again? Hope deferred maketh the heart sick, and our hope is surely deferred long enough. This is the month in which I expected to do something, no matter how little, and here we are, held as fast as we were in March.

August 5th, Thursday. — Last night at midnight we ended a meteorological year of hourly observations, and, as a relief to all hands in making them, I ordered hereafter three-hourly readings of the instruments instead of hourly.

August 6th, Friday. — At last I have good observations, and I find the ship is in latitude N. $73^{\circ} 21' 30''$, and longitude W. $177^{\circ} 14' 45''$. Since the 2d we have drifted twenty-four miles to N. 86° E., or six miles a day; I am disappointed, because I expected to find a greater distance accomplished. We have had as much wind in the past four days as we can expect during mid-summer, and the conditions of ice loosening are, one would suppose, at their most favorable point. It seems a certainty, therefore, that there is no expanse of open water east of us, and the ice is not slack enough to afford a passage. As day after day passes by, and no chance offers to accomplish anything, I feel my heart sink. To have zeal and energy enough to dare anything, and be held like a rat in a trap, seems the irony of fate.

August 9th, Monday. — Observations place us in latitude N. $73^{\circ} 24' 32''$, longitude W. $176^{\circ} 39' 15''$, a drift of one and seven tenths miles N. 22° E. since yesterday. We sound in thirty-nine fathoms, — and the lead line shows no perceptible drift; we have therefore come to a stand again, and unless something we know not of works in our favor, we shall probably zigzag again without aim or result. I cannot find words in any language which will express the sense of utter disappointment, shame, and mortification with which I am filled, in seeing a second summer fade away with nothing accomplished.

August 10th, Tuesday. — A gloomy, dreary, uneventful day. Fog or rain all the time.

August 11th, Wednesday. — Apparently our situation is growing worse each day instead of better. We made the unpleasant discovery to-day that the amount of the leak is increasing; for during the last twenty-four

hours 1,295 strokes of the bilge-pump were required to keep her free, and since July 15th, 240 strokes per day have been sufficient. Of course there is a reason for this, but unfortunately we have to guess at it. Measurements of the thickness of the ice at accessible places show a diminution of one inch since July 13th; and it may so happen that the wasting away of that amount of ice (whether at the top, and so causing it to float higher, or at the bottom, and accomplishing the same effect) has uncovered the damaged stem and presented a freer access to the water. This is conjecture simply; the fact is the water, and must be dealt with. We have the windmill for the present, and should we be held here another winter, we have, thank God, enough coal to run a pump in the deck-house.

August 12th, Thursday. — Observations to-day show a drift since the 9th of five and a half miles to S. 38° E. The irony of fate! How long, O Lord, how long?

August 13th, Friday. — Rainbow at ten P. M. Sunset at 10.20. This is the first time we have been able to see the sun at this interesting event since he recommenced his for-a-time-suspended habit of going below our horizon. Some little fog in the forenoon. These fogs please me, for they cut away the ice amazingly.

August 14th, Saturday. — Our mild weather continues, and as the winds hold from the northward and eastward, it must be occasioned by open water in that direction. This is no better than a conjecture, of course; for remaining fast in one spot we can only guess what may be the state of affairs fifty miles from us in any direction. Inasmuch as the high temperature and N. E. wind are accompanied by rain, fog, and mist, the conjecture of open water is a reasonable one.

August 15th, Sunday. — Our mild weather continues,

and so does the fog. It is surprising to see how this latter cuts away the ice. The full sun of June 21st did not do half the execution that to-day's fog accomplished. The ice seems actually to be rotting away. The surface is soft and spongy, and fully honey-combed; and but for the fact that there remains ice varying in thickness from two to twenty feet, there is no reason why we should not resume our voyage. The ship is still held affectionately by ice gripping her nearly down to her keel, and by its attempt to rise, heeling her over $7\frac{1}{2}^{\circ}$ to starboard. Here and there on either beam, holes varying in size from one to six feet extend down through the ice, and at a distance of one half mile on the starboard beam, and one mile on the port beam, there is a narrow lane of water (starboard with a W. wind, port with an E. wind, neither with any other), which serves to make our immediate vicinity an island; so that if we could get to this lane we might have the pleasure of sailing around a circle, were we not meanwhile crushed by the ice coming together, for beyond the lane in any direction is ice of the cheerful and consoling thickness of twenty to forty feet. Inspected ship at ten A. M., and had divine service afterwards. Sounded in thirty-nine and a half fathoms, a marked drift to N. E. being indicated by the lead line. A curious fact, because we have had light breezes from northward and eastward all day, and this shows a drift to windward. Between ten and eleven P. M. had some heavy passing showers. At midnight a remarkably heavy water-sky showed itself to the southward.

August 16th, Monday. — Foggy and misty weather continues unchanged. Sweetman commenced altering the frames and stanchions of the deck-house, to carry out my plan of improving its arrangement next winter,

by beginning it at the bows, and so covering the spar deck over the entire berth deck.

August 17th, Tuesday. — And so day by day our glorious summer is passing away, and we are accomplishing nothing. It is painful beyond expression to go around the ice in the morning and see no change since the night before, and to look the last thing at night at the same thing we saw in the morning; and this has continued nearly a year already, and may continue — ? To start out full of zeal and energy, and to receive a stunning blow at the first step, is somewhat demoralizing. If we could only do something. Like Hamlet, I can say, “Wouldst drink up eisel? eat a crocodile? I’ll do it” — And so I would, if by so doing I could change our position to one of usefulness. High as our temperature is (34°), foggy weather a daily occurrence, the most favorable occasions for getting rid of ice, except frequent and varying gales of wind to break it up and make openings, and yet here we are hard and fast, with ponds here and there two or three feet deep, with an occasional hole through to the sea. Is this always a dead sea? Does the ice never find an outlet? Surely it must go somewhere; for as the thaw in three months by no means equals the growth in nine months, it would require but a few years to make this a solid mass, and so take up this Arctic Ocean entirely. It does not get out through Behring Strait, for all ice met in Behring Sea, or nearly all, is the formation of that locality. It has no regular set in any direction, north, east, or west, as far as I can judge, but slowly surges in obedience to wind pressure, and grinds back again to an equilibrium when the pressure ceases. Are there no tides in this ocean?

Drifting about as we are, no tidal measurements are

possible. When last fall and winter we had our greatest pressures at new and full moon, their regular recurrence seemed to indicate that tidal action existed, but now the moon has no effect whatever. Full moon or new moon, last quarter or first quarter, the ice is as immovable as a rock. We are, of course, further north now than we were last winter, and may have got beyond the Siberian tides, while still south of the tides mentioned further north as ebbing and flowing through McClure Strait. In case this is so we should be in a dead space, and might, like Franklin's ships, never get any further. But what is there to the northward of us? It is hard to believe that an impenetrable barrier of ice exists clear up to the Pole, and yet as far as we have gone we have not seen one speck of land north of Herald Island.

Our water temperatures and soundings taken daily give no encouragement; the surface has generally a temperature of 34° , due, of course, to its exposure to the sun and retention for a long time of the heat imparted. Two fathoms below the surface the temperature is 31° , and at the bottom 30° . At a temperature of $7\frac{1}{2}^{\circ}$ above the freezing point of salt-water, the lower ice cannot melt rapidly. On the surface, the sun's rays, or the cutting fog, or the warmer water at the edges, make a wasted and rotten material; but under water the ice has the same flinty hardness it had during mid-winter. And it is of such irregular and varying thickness that no idea can be formed of its age or origin. We know that last November, when we were squeezed out of the heavy ice into our present location, we were in open water, — a lake, so to speak. By careful measurement we know that ice formed on this lake to a thickness of five feet four inches by February 4th. Then

its thickness could no longer be accurately measured, because of under-riding floes; but it is reasonable to suppose that it got a thickness of seven feet. On the 13th July that ice was five feet in thickness; to-day it is three feet five inches thick. Either we have had our summer, or are yet to have it, which latter sounds absurd on this 18th day of August. If the former surmise is correct, three feet seven inches may be taken as the thaw of one summer, and the remaining three feet five inches will form a basis for next winter. Already our little ponds have frozen over during the night, and remain frozen until noon of the next day. Thus much being said of ice which we have seen grow around us, how are we to discuss ice which is twelve feet, twenty-two feet, twenty-four feet, thirty feet, and forty feet in constant thickness? We see ice which has been piled up in confused masses twenty-four feet above the surface of the water, and can but guess at its thickness below. We drop a lead down to a projecting tongue twelve feet, and think we have the thickness of that floe at all events; but lo! a little further and we see another projecting tongue, or perhaps a third, or when we get to twenty-two feet we cannot obtain an up and down sounding by reason of surface irregularity.

August 18th, Wednesday. — Another day of ice scenery without any perceptible change in our surroundings. A marvelous temperature ranging between 31° and 40° makes me hope for some decent weather. To me to-day the temperature has been sultry and at times oppressive, the generally pervading fog seeming to intensify the effect of the heat. To our great surprise we get forty-four fathoms, with mud, gravel, and fine white sand.

Our sick-list had an increase to-day in the person of H. H. Kaack, seaman. While passing along the berth deck he fell, and striking his right arm against the corner of a hatch cover broke his elbow joint. The doctor has the case well in hand, and anticipates no serious result beyond being deprived of his services for some time.

August 19th, Thursday. — To-day the excitement was the killing of a bear. Mr. Dunbar started out this morning immediately after breakfast, and came back about five P. M. with the news. During the afternoon, while in company with Alexey, the latter called his attention from a little distance by call or signal agreed upon, — the note of a crow. Looking around, Dunbar saw, as he says, “the biggest bear he has ever seen, — a regular buster,” — following in his tracks. He crouched down at once to let Bruin come up; but as the bear got within good range, say two hundred yards, of Alexey, before he reached Dunbar, Alexey fired and dropped him. We have learned up here that it takes many bullets to kill a bear, so no surprise was felt at seeing him jump to his feet and make off, though pumping out blood through a hole in his left side as he ran. Fortunately for us, he ran towards two men, Nindemann and Bartlett, who fired and finished him. Dogs were sent for the carcass two miles east of the ship, and they brought in a small bear six feet six and one half inches long, and four feet seven inches in girth, thus showing the effect of a sudden surprise on Mr. Dunbar. The body was honored with a burial in the ice to keep it cool and fresh, whether for our consumption or that of the dogs will depend upon their necessities. They are now fed about three times a week from the seal yard.

August 20th, Friday. — A day which can be disposed

of with but few words. Cloudy all day, except for a short time in the afternoon, when the sun broke through the clouds too late for a latitude and too early for a time sight.

August 21st, Saturday.—On pages 192 and 288 I have dwelt at some length on the nature of the water resulting from sea-water ice, and I shall add a word or two here on that subject before closing it. There can be no doubt of the importance of this matter in reference to the health of Arctic expeditions, for no man can receive continually or habitually as much salt in his system as we find contained in our ice without speedily becoming scorbutic. Though previous expeditions have asserted that they found and used ice sufficiently pure for consumption when melted (and ice formed from the freezing of salt-water at that), it is a somewhat singular circumstance that the crews became victims to scorbutic complaints. Dr. Walker mentions the circumstance of the men of the Fox digging too deep into the re-frozen ponds of melted snow, and getting ice too salt for domestic use.

Our experience this summer is as follows: On the 7th of July we succeeded in getting enough snow and surface scrapings, that is, broken down ice crystals from tops of hummocks, to fill our tank with water sufficiently pure for our use, for the first time since last fall. The steady glare and heat of the sun had melted and honey-combed the mass, and allowed the salt heretofore contained to filter through and deposit at the bottom. (Not all of the saline ingredients had so deposited, for a very faint milky tinge would appear in the water when tested with nitrate of silver; but the water was pronounced sufficiently pure for drinking.) This snow and surface crust were carefully scraped up,

put in barrels, and brought to the ship, where a cupful being melted from each barrel, a nitrate of silver test was applied, and the barrel accepted or rejected as the case might be. Regularly each morning was this arrangement carried out, some five or six barrels accumulating on the quarter-deck where the snow stood and thawed to some extent. From these barrels our supply was taken for melting in the galley for our uses. This morning an unusual degree of saltiness in the new supply seemed to threaten our having got down to a line of salt deposit; and in the course of Dr. Ambler's tests he dipped a cup of water from one of the snow barrels, which had some days ago passed inspection, and he found it too salt for use, although a cupful of snow in that barrel being melted was found quite pure. This curious result is worthy of notice. The barrellful of snow standing in the sun had become soft and honey-combed, and the small amount of salt had dropped through with the drops of water and remained, of course, with them, leaving the snow so much purer. Of course it is impossible to say that the entire contents of a barrel are of the same character as the specimen cupful, some pure and some impure getting scraped up together; for it is plain that if the barrellful were no different from the cupful, the melting of one would give the same purity of water as the other. It is to be remembered, however, that the salter the water originally the lower the freezing point, and, consequently, the melting point, hence the salter ice commences to melt first and deposits its salt, which, falling into the liquid, makes a concentrated solution which may be unfit to drink, though the remaining snow will yield a potable material. Our method of examination and test is the only practicable one. Properly each barrellful

should be melted and the water examined ; but this would consume more fuel than any ship could spare, and consequently it is out of the question.

The idea that I desire to fix is, that sea-water ice, under whatever circumstances it may be found, whether of temperature of the air at time of freezing, or number of thaws and re-freezings, or age, or thickness, or location, is a treacherous and unsafe element to use on an Arctic expedition, as an internal application ; and no matter how much care may be exercised in its examination and test, the chances are ninety-nine in a hundred that sufficient salt will be received into the system by continued use to enfeeble it and prepare it for scorbutic attacks under any unusual exposure or exertion, even if its use does not produce scurvy alone and unaided. Having thus disposed of the salt question, about two lines will describe to-day's arrival and departure. A few hours' sunshine in spots, in early morning and at three P. M., fog and mist thence till midnight.

August 22d, Sunday. — The thirty-sixth anniversary of my birth, and but for an episode in the afternoon it might have passed away without reference.

Of late I have each afternoon been accustomed to take the dingy and scull around and through the little streams of water that have formed in our surrounding floe, watching the wasting of the ice, and making out in my own mind where a break may occur by connecting the several holes wasted clear through to the deep water. So narrow are these little streams, that in some of them one has just room enough to use two oars and row, and in many he is obliged to scull. So winding and intricate are they, that I am reminded of the maze at Hampton Court as presenting a parallel.

This afternoon I started off as usual alone, and had

rowed and sculled unconcernedly a mile or more, although at no time more than five hundred yards from the ship in a straight line. At this point I reached a long narrow lead which obliged me to scull, and facing aft, to use both hands, I, of course, saw nothing ahead. Thinking after a time that I must be near a bend I looked over my shoulder, and to my astonishment found my eyes resting on a bear not quite a hundred feet off, and who, judging by his looks, was quite as astonished as I was. The relative situation was worthy of a photograph. Here was a predicament. To run was out of the question for me, for it would have been too uneven a match had the road to the ship been a level and clear one instead of across alternate ice and water, which of course made it worse. There was no water between me and the bear, but I was jammed in a narrow lead and he stood looking at me. The water would have made no difference to him, though it would have to me. Looking a bear out of countenance is very romantic but not practicable, and I found the bear recovering from his astonishment and advancing toward me. I then yelled, "On board ship there! a bear! a bear!" but got no answer. Bruin by this time was about fifty feet from me, so close that I could see distinctly where the short hair ended at the edge of his beautiful black nose. Hearing my shout he stopped, and looked at me wonderingly. I again shouted, "On board ship there!" and somebody answered, "Halloa." Mentally calculating my chances I again yelled, "A bear! a bear!" and at the same time I raised an oar to fend him off should Bruin come to the boat. He stood still, however, and looked as if he could not quite make me out. Just then a string of men and dogs rushing around the stern attracted his attention, and he gazed at them

until, judging they meant him no good, he turned and ran, so fast that before the men and dogs could get on his trail he was out of range.

Lesson for me : "Never go away from the ship without a rifle."

Usual Sunday inspection followed by divine service.

August 23d, Monday. — It is now ten days since I have obtained sights, and by a singular circumstance they have been days of unusually high temperature ; I say unusually high advisedly, because we have become so accustomed to experience a temperature of 32° , or under, that any excess is worthy of notice.

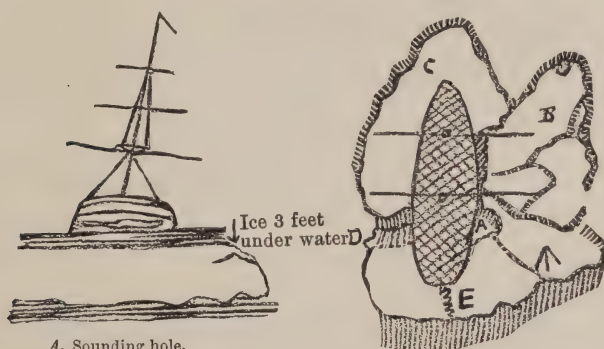
August 24th, Tuesday. — But a short time since and we were reveling in the enjoyment of a sun above the horizon the whole twenty-four hours ; and to-night at midnight a lantern was necessary to read the anemometer. The thermometers having bright metallic surfaces are easily read without artificial light. For about two weeks we have had the cabin lamp lighted every evening at nine o'clock, the dark and gloomy weather we have had making it necessary. Alas, alas ! a second winter before us and nothing done. Our daily hunting parties are coming back empty-handed. Seals enough are seen and shot, but they sink almost at once and are lost. This is their season for shedding their coats, and there seems to be a connection between that episode and the fatness of the seal (or the thickness of his blubber). Under ordinary circumstances a seal, when shot, seems buoyant enough to float until his carcass can be reached by a kyack, or by traveling on a cake of ice. But now the moment his skin is punctured down he goes. To-day Chipp and Dunbar saw four oogooks (or one oogook four times), but at too long range for a shot.

All reports seem to agree in pronouncing the ice in a wasted and disintegrated condition, needing only a fresh blow to send it into blocks and pieces. But by our ill luck we are having only light airs from the northward and a normal barometer.

August 25th, Wednesday.—A day of considerable interest, from the occupation in which we were engaged, and of great satisfaction from the results obtained. I have long been anxious to have a sight of our propeller, to know what injury it sustained during our numerous ice-squeezes and jams. Although I sometimes regretted not having tried it up last fall, upon becoming fixed in our icy surroundings, I could not help feeling during the crises of the winter, particularly on the memorable 19th of January, that its being down added greatly to the support of the rudder-post, and perhaps prevented its (the rudder-post's) destruction, and incidentally a crippling of the ship. An injury to the screw-blades we could endure, because we had spare ones to take their places, although if the blades were much bent or twisted, we should perhaps be unable to get them up to replace them by others. The ice surrounding the ship's stern had a thickness of nine feet in some places, and its surface was about two feet under water. Sawing it, therefore, seemed a herculean job, while blasting it with torpedoes might injure the ship. However, I determined to try sawing, and Chipp, with the tripod on the starboard side, and standing in the water to his knees, directed operations, while Nindemann, on the port side, similarly immersed, attended to that portion of it.

Suspending an anchor weighing about eighty pounds to the bottom of the saw, a rope was attached to the upper end, led through a block at the tripod head, and

then over the rail on board, where it was manned by some hands, while Chipp, with two men, pointed and guided the saw by means of a bar in the saw's upper end. During the forenoon the small sawing, picking, and chiseling were done on the port side, where a number of small holes were connected; and in the afternoon both sides were worked at. As soon as the tripod got near the ship the fall was led through a block on the mainyard, and the sawing proceeded with good speed,



- A. Sounding hole.
 B. Ice ten feet thick.
 C. Tripod for sawing ice.
 D. Holes through the ice connected by small saws, picks, and chisels.
 E. Place where floe broke in two.

(From a sketch by Capt. De Long.)

although laborious and trying to the men standing in the water guiding the saw. By 2.30 P. M. the saw had nearly reached the sounding hole, when, crash! bump! bump! the floe broke into two large cakes which came to the surface striking hard under our counter, and rolled and swashed like two whales. While some of the men got ice-claws, and with ropes dragged the cakes away, others rove off the propeller-purchase, and Melville went below to get the blades vertical. Upon trying to turn the shaft, he found that it would only go a little way, and we began to fear the blades were so bent as

to take against the forward side of the casing. When we ceased steaming last fall, the blades were left up and down, and in our ice pressures they had been turned about one eighth of a revolution. Fortunately when the ice was removed we could get the blades to a hoisting mark, although they would not revolve. So we hove away, and to our satisfaction up came the screw, and to our equal surprise and delight we found it in perfect condition with not even a scratch. It was, however, as bright as new copper, looking as if it had been freshly scoured. With a view to learning what the shaft's not turning was due to, I directed Melville to turn the engines over while the screw was up, and it was found impossible to get the shaft any further around than before. Ice may have formed and lodged in the sleeve of the dead-wood, and as this can be determined by removing the packing from the stuffing-box, we shall probably know more about it to-morrow. Lowered the screw again to its place, soon I hope again to be employed in beating the water to drive us on to the accomplishment of some worthy object. The consequences to the ship by the removal of ice from under the stern are logged by me as follows: —

“The ship immediately went down in the water aft seven inches, and came up forward one half inch; the water-level being now at a height of seven feet two inches on the stem, and thirteen feet nine and a half inches on the rudder-post. The heel is now $8\frac{3}{4}^{\circ}$ to starboard, having been increased only $\frac{1}{4}^{\circ}$ by the change of immersion. The ship is yet firmly held by ice, which extends from the main rigging on the port side around the bows, and to the after part of the fore rigging on the starboard side, and which, where possible to measure, is found to have a thickness of ten feet eleven inches. It probably extends under her keel, forming a cradle; and though it would perhaps be possible to haul the ship astern into a small

pool of clear water, it is not attempted for fear of increasing the facility with which water might enter through the damaged stem, and so require additional labor, or even steam-pumping, to keep the ship free. Without a single lead of water in any direction accessible to the ship, her being navigated is impossible, and there would be nothing gained by her being floated into a small lake."

Immediate examination showed no change in the amount of water coming into the ship, and as no water could be found coming into the supposed leak in the shaft-alley, it is now believed that the water there was caused by the melting of ice between the frames. And so this eventful day came to an end. Much work done and some pleasant knowledge gained.

August 26th, Thursday. — A day of considerable excitement occasioned by the advent of no less than four bears, and our killing one of them. About 1.30 P. M. Mr. Collins, while walking on the ice on the port side of the ship, saw a bear through the fog about one hundred yards distant. Giving the alarm, off started the dogs, immediately followed by Nindemann and Aneguin. Bruin of course turned and ran, and meeting a pond in his way plunged into it. It happened, however, to be inclosed, and before he could swim across it the dogs had encircled it and held him at bay, one of them, it is said, biting his bearship on the nose whenever he attempted to land. Aneguin and Nindemann coming up fired one and two shots respectively, Aneguin missing and Nindemann hitting, and the prize was our own. Of course we were all out there at once, and harpooning the carcass, dragged it to the ice, and thence to the burying-ground.

Hardly had the meat been buried, and our usual occupations resumed, than three more bears hove in sight,

this time on the starboard quarter. Collecting quietly on the poop we awaited, rifles in hand, their approach. The party seemed to consist of a mother and two nearly full-grown cubs. Our dogs were being fed on the port bow, and thus made no demonstration. Perfect silence reigned. Our past experience warning us of the small effect of a bullet at long range, and the ease with which a bear makes off when hit several times, we decided to wait until the bears would come no nearer, and then pour in a volley. Along the starboard rail were ranged ten rifles in rest: tableau!

The mother led the van, the two cubs following. Slowly and deliberately, head to wind, neck stretched out like a cow's neck, nose describing graceful curves in time with each step, Mrs. Bruin came along, falling lazily into the water lanes when she met them, swimming across slowly and reaching the shore, looking back to encourage her children to cross the briny deep. When the party reached a point which we considered two hundred yards distant from the ship they paused, and Mrs. Bear, seemingly distrustful of what she saw, and her nose scented, turned as if to retreat. At this moment, by preconcerted signal, we fired. Down tumbled the big bear, and one of the little ones jerking up a foot and shaking it seemed hit also. The cubs immediately closed on the mother, and while the three were in a heap the firing continued until the smoke hid the objects. At the first shot away went the dogs, followed, when the firing ceased, by Dunbar and Ericksen and others. When the smoke cleared somewhat the three bears were in full retreat, safe, if not badly hurt, because the dogs would not, and the men could not, cross the water lanes through which the bears went without hesitation. Jumping into the dingy, Chipp, the doc-

tor, and myself ran and sculled "across country," but our game was out of sight, Dunbar and Ericksen in chase. Going to the spot where the animals stood, we found blood, and followed it on two trails, so that we knew two of the bears were hit.

But we lost them. Dunbar and Ericksen kept on, and managed to drop the heretofore uninjured cub, but only for a moment. The many leads gave the bears too great an advantage, and though the trail indicated severe wounds, the chase might have continued for hours before any approach to an end would have occurred. Dunbar tells me he noticed the great care over and solicitude evinced by the mother for her young. The cubs being wounded were more disposed to stop than to go on; but the parent, though hurt herself, kept pushing them before her, covering their retreat and nosing them into the water in front, before she would leave the ice herself. It is too bad to hurt or disable these creatures, and have them suffer and die perhaps beyond our reach; but it is the fortune of war, and as we try to kill when we shoot, we cannot help it if we only wound. I am satisfied that unless at very short ranges, or a vital part is hit, an ordinary rifle bullet like a Remington or a Winchester is of no use. An explosive bullet is required. Unless dogs can surround a bear and hold him at bay, he may have half a dozen bullets in him and yet escape. Over ordinary ice the chase is too unequal for a man alone; over ice cut up by ponds and rivulets, as our neighborhood is, a successful chase is a physical impossibility. The water is too deep for a man to wade, and the dogs will run a mile before they will cross three yards of water. This, of course, gave us something to talk about

during the afternoon and evening, and all the changes on bears and bear-hunting were rung *ad infinitum*.

While the doctor and I were in chase we came to a place on the trail where one of the bears seemed to have sat down, for the snow was colored red for quite a space. Examining more carefully, however, we saw that it was "crimson snow," so-called (*infusoriæ*, about which, as to whether of vegetable, marine, or cosmic origin, so many diverse opinions are advanced). Gathering some of it the doctor examined it with a microscope, and he thinks it is pink-colored marine algæ, probably a species of *protococcus*.

Lest I have not mentioned it heretofore, I mention here that Mr. Collins discovered some magnetic particles (meteoric iron) in a lot of sand and gravel found on the ice two miles to the eastward by Mr. Dunbar.

When not engaged in chasing bears, our men were engaged to-day in sawing up and removing the ice which we displaced around the stern yesterday. The engineer's force was employed in trying to get the shaft to revolve. Uncoupled the engine from the line shaft, and found that the engine could be moved readily. Coupled up again and removed the packing from the stuffing-box of the stern bearing until the water ran freely to the box. Then tried to jack the engine and shaft as coupled together, but without much effect. The difficulty seemed to be in the stern-pipe or sleeve (as we supposed yesterday), as there was a noise as of grinding in the pipe, and supposing it to be occasioned by ice, the stuffing-box was so arranged as to admit during the night a small, steady stream of water to aid in thawing.

August 27th, Friday. — Another day of fog — impenetrable as a wall. Temperature, maximum 35°, min-

imum 31.7° . We continued to-day the work of cutting up and dragging away the pieces of broken floe, finishing it about five o'clock. All along our starboard side, from the fore rigging aft, we have "open water," a hole extending diagonally across the ship's keel from the starboard bow to the port quarter, and long enough to float the ship in should she slip from her cradle. In slueing a piece of floe this afternoon, a tongue projecting under water struck the ship's side abreast of my room, and though the shock was not great, it caused the ship to shake fore and aft, showing that the ice forward is balancing her weight so nicely that but little would be necessary to shake her off. I think it is a question of only a few more days' thaw and the Jeanette will slide into water again, and then we shall know what kind of a leak she has.

Melville continued the work of trying to turn the shaft again to-day, having allowed the water to run in slowly last night through the stuffing-box of the steam bearing, but little improvement was noticed. He therefore took out all the packing and let in a full head of water. This did the work. All ice seemed to disappear, and the engines, shaft, and screw could be jacked to a charm. We packed the stuffing-box, and now everything connected with the machinery is in perfect running order.

August 28th, Saturday. — By great good fortune I was able to-day to get sights for a Sumner, whereby I find the ship in latitude N. $73^{\circ} 37'$, longitude W. $177^{\circ} 13'$, and that is N. 42° W., twenty-four miles from our position on the 13th instant. How much we may have zigzagged, or how much ground she may have gone over, we shall never know. It is some consolation to know even where we are. A day generally of fog. Curious! a rising barometer with a southerly wind.

August 29th, Sunday. — Another week come and gone, and here we are yet. Of course it is for the best that we are here, else it would not be the case; but oh! how hard, and, in fact, impossible it is to draw any consolation from it. Our situation seems unchanged, and its continuance inevitable. Although I have been buoyed up during the last two weeks by the mildness of the temperature, and its probable wasting effect on the ice, even that comfort is removed now by a fall in the temperature early this morning, and the appearance of young ice on the surface of our ponds which did not disappear until near noon. Although passing a second winter in the pack is not a pleasant thing to contemplate, I do not think an officer or man shrinks from it because of the danger to be incurred, or the discomfort to be endured.

But we cannot help asking ourselves the question, "Shall we be any more successful when it has passed?" Here we have been nearly a year drifting with the ice to and fro, and we are about one hundred and forty miles N. N. W. of where we started. Let us suppose a year from now we are still one hundred and forty miles north of our position to-day (latitude N. $73^{\circ} 41'$, longitude W. $177^{\circ} 13'$), or say N. $76^{\circ} 30'$. We shall then be 800 miles from the Pole, and 500 miles from a Siberian settlement, with a disabled ship, no fuel, and perhaps as immovably jammed as now. Supposing our progress were in the same successive manner the next year, and so on, in six additional years we should reach the Pole. But what is the use of figuring it up — a man might as well attempt to demonstrate by mathematical calculation the day of his death. Let us deal with the present.

The long continuance of foggy, damp weather, and

the extent to which our men were obliged to be in the water while sawing ice, have led to the accumulation of a large quantity of wet clothes. In order to dry them I have ordered a fire on the berth deck, which, commencing on Friday, continued yesterday and to-day. This makes a sad expenditure of coal (145 pounds), but it is necessary for health and comfort that people should wear dry clothing. Sweetman continues his work of altering the deck-house for our possible winter's detention, and as he always makes a thorough finish of anything he undertakes, the altered house is as much like a new one as possible. He is as invaluable a carpenter as he is desirable as a cheerful shipmate, and I cannot be too loud in his praise. His exertions, with those of Nindemann, down in the fore peak on and after January 19th will always remain indelibly fixed in my mind.

Inspection and divine service took place as usual on Sundays. We sounded in thirty-seven fathoms, a drift to N. N. E. being indicated by the lead line. Light southerly breezes four miles an hour, freshened by midnight to ten miles, and yet a temperature at one time as low as 28.3° !

Have Behring Strait and the ocean south of us closed thus early? If so, by what accident shall we find water north of us? Fog, mist, and drizzling rain as usual, but I managed to get some fair sights, showing our position obtained yesterday to be reliable.

The outlook from the crow's-nest is dreary enough. Ice, ice, ice! In the little basin or valley in which we are numerous rivulets and pond-holes may be seen; but beyond what was once our encircling mountain ridge twenty to forty feet high, and now a ragged mass of confused chunks, is a seemingly endless ice desert, with

a black pool here and there, but no leads, no channels, no avenues of advance or retreat.

August 30th, Monday. — Our foggy weather seems to be ready for a change, for at ten this evening the fog rolled away from overhead, leaving a clear blue sky with a bright moon, and at midnight Jupiter and Aldebaran were also in plain view, being the first time that stars have been visible since last spring. As a thing to be remembered in connection with the dispersing of the fog, the temperature suddenly fell, and at midnight stood at 26.4° , and this too with a S. E. wind. It would seem that the water is disappearing to the southward, and a flock of phalaropes flying to the southward to-day would seem to indicate that the water is disappearing (if it ever existed) to the northward. What, then, is there in store for us?

Poor old Snuffy, having reached such a condition that it would be a mercy to kill him, was shot to-day. For some days his head had swollen to an awful size, and he had wasted away to a shadow. Lying on the ice, the heat from his body had thawed away a hole, and he was sinking gradually from view. No doubt, as far as his usefulness was concerned, he might have been killed months ago; but I felt that even a dog was entitled to his life as long as he could keep it in these uncharitable regions. However, the poor brute is gone now. His three companions, Prince, Tom, and Wolf, seemed unable to comprehend his disappearance, for they gathered around his old ice-hole in inquiring anxiety. But only for a time. The natural though miserable regard for self soon drew them to other things. What a life this is, when the shooting of a dog so impresses me that I give a dozen lines of my journal to its mention.

Our little lakes and rivulets were covered with ice at

midnight, and a white frost was deposited on all instruments at the observatory.

August 31st, Tuesday. — The last day of summer has come and gone, and, so far as our release is concerned, we are apparently no better off than we were on the first day of summer. A cheerful fall of temperature occurred during the night, and in consequence we find ice three quarters of an inch thick over all our ponds this morning. Three quarters of an inch does not seem like much in the abstract, but it was more than we could push, pull, or scull a boat through without cutting it ahead with an ice-chisel, and Melville and I who tried to do so are not the weakest of men. On the other hand, we had a remarkably high temperature in the middle of the day (35° to 37°), an almost cloudless sky, — in fine, a heavenly state of weather for these regions.

So bright was the sun that it was a pleasure to take sights. Excellent observations place us in latitude $73^{\circ} 46'$ N., longitude $176^{\circ} 48' 45''$ W., showing a drift since the 29th of eight and one half miles to N. 53° E. The magnetic variation is $22^{\circ} 4'$ E. A reference to my drift-table shows that we have drifted this month altogether ninety-two and one half miles, and have made good fifty and one half miles to N. 51° E. Of all months in the year this month should give the slackest condition of the ice, and yet we have changed our position but little.

As if additional evidence that summer is gone, the aurora made its first reappearance after many days. At 11.15 P. M. a faint, tremulous arch could be seen passing from east through the zenith to west, and at midnight pulsating curtain patches moved from west to east, at an altitude of about 20° above the southern

horizon. The moon, Mercury, Aldebaran, and one or two other stars showed in the heavens after eleven o'clock. The engineer's force shifted about eight tons of coal from the starboard to the port side of the bunkers, in anticipation of our getting afloat and needing "straightening up."



CAIRN TOMB, MONUMENT HILL, LENA DELTA.

CHAPTER X.

THE RETURN TO COLD AND DARKNESS.

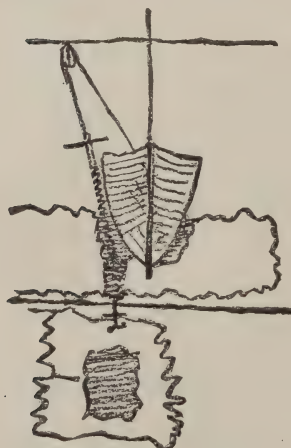
September — December, 1880.

The Ship Afloat. — On an Even Keel. — Again Frozen In. — A Snow-Storm. — Prepared for Winter. — Dog Food. — The Village on Deck. — Monotony. — The Dogs' Treatment of each other. — Chase after a Bear. — The Health of the Men, as shown by Rapid Recovery. — Anticipations of Removal. — Pure and Impure Air. — The Beauty of the Night. — Sensitiveness to Cold. — Fox-Tracks. — Observations. — Treadmill of Life. — The Effect of Arctic Life on Health and Spirits. — Sudden Appearance of the Sun. — Shocks to the Ship. — The Dryness of the Quarters. — Sleeplessness. — A Minstrel Entertainment Christmas Eve. — Christmas Dinner. — Auroral Display. — The Last Day of the Year. — The Jeannette Minstrels. — Courageous Outlook.

SEPTEMBER 1st, *Wednesday*. — At last we are on an even keel! This morning at 9.35 the ship suddenly righted, and moved astern about two feet. It was done very quietly and without shock, except to a dog who was on the gang-plank, and was suddenly tumbled, to his surprise, on to the ice below. Thin ice had formed around our free part to the thickness of nearly an inch, and the cracking and breaking of this film (?) was the only accompaniment to our movement. One or two large chunks of ice rose to the surface on the port side, and then all was still.

By previous orders, at the first movement Sweetman ran down in the fore peak and closed the opening in the extra bulkhead built last January. We feared that on

taking the water again our leak might largely increase, but we found for the time no difference. The water-level on the ship was at the height of eight feet four inches on the stem, and thirteen feet five and three fourths inches on the rudder-post. Believing that the ship was fairly afloat (her stem being sixteen inches from the groove in which it had been resting), we carried an ice-claw to the floe astern, placing it on our port quarter, and, attaching a hawser, tried heaving with the capstan. To our surprise, beyond swinging her bow a little to starboard, perhaps a point, the ship was immovable. Thinking the ice on either bow was holding her, we took the ice-claw in a line right astern, and hove again until we parted the hawser. Then we went to examining the ice around her bows. The groove in which her stem had rested was in plain sight, and a crack in that floe extended right ahead. Right against the bows on either side there was water, but on reaching down a measuring rod under the starboard cat-head Chipp found it strike on ice at a depth of seven feet four inches. Evidently, then, her keel and forefoot were yet held in a



Sawing the Ice Under the Forefoot.

cradle. Desiring to get a little away from the heavy floe which had damaged us last winter, a larger hawser was got out right astern and hove on, but without effect. The ice-saw, worked by a rope from the fore yard, was then brought into play, and put down a hole which we found in the cradle-piece, which, with its other part eleven feet in thickness, we commenced to saw through. After we had sawn for about five or

six feet, dinner time came and we stopped. A careful watch had been kept of the leak, and it was now found that more water was coming in than formerly. I was anxious naturally to get the ship afloat properly, but of course I did not want to do so at the cost of materially increasing the leak while there was no chance to navigate her. Upon reflection, I concluded to leave well enough (or bad enough) alone, and accordingly all sawing and hauling was suspended. I have some fear that the broken stem or sprung garboards, whichever is the damage, may be firmly held in the ice, and that all our hauling will only tend to open the rent still more widely and leave us with a filling ship.

From noon to eight P. M. 1,044 strokes were required at the quarter deck pump to keep her free, or about 3,200 strokes per day. On the 11th August 1,295 strokes kept her free, and before that, and subsequent to July 15, 240 strokes per diem kept her free. I have no desire to go back to steam-pumping again, and God forbid that it should again be a question of main boiler and Sewell pump. With the emergency of a second winter in the pack staring us in the face, we cannot be too saving of our fifty-three tons of coal. An equal weight in diamonds would not tempt me to exchange.

The increased comfort of being on an even keel is very great. No longer is moving about awkward and inconvenient; our plates and cups are not now tempting their contents to slide away over the table-cloth, and we do not have to mount high in the air to get on board ship from the ice. The ship looks now something like a ship. Standing upright, with her nose well up, she looks like a horse eager for a start. But, poor lady! she has no chance to do so yet. All the steam-power of all the engines and boilers, and all the

strength of all the ships in the world, if combined in her, would not be able to get her to the open sea just now.

At eight P. M. the water-level stood at 8 feet 10 $\frac{3}{4}$ inches on the stem, and 13 feet 4 $\frac{1}{2}$ inches on the rudderpost, showing a settling forward of 6 $\frac{3}{4}$ inches, and a coming up aft of 1 $\frac{3}{4}$ inches, due probably to the effect of the hauling.

September 2d, Thursday. — A cheerless and gloomy day. The usual fog in the forenoon, and in the afternoon until midnight an almost steady fall of very light snow. In one day we seem to have jumped into winter. All our lakes and rivulets are covered with ice an inch in thickness, and that in turn being hidden by snow, the general view is as cold and cheerless as possible. While we had such mild temperatures, and the ice was in a soft and loose condition, how anxiously we hoped for a gale of wind to break upon us to give everything a good shaking up and, perhaps, release us from our fetters. But now that everything is beginning to freeze fast again our chances of liberation seem infinitesimally small. However, never say die! something may be done in the month of September after all. Everything is for the best.

A calculation of the work done by our quarter deck bilge-pump, running 3,200 strokes per diem, gives 2,741.76 gallons of water (or, 114.24 per hour) as the extent of the leak at present.

Mr. Collins on returning from the lead, about two miles ahead of the ship, reports that it is about one hundred yards in width.

For a day or two there have been indications of land to the northeast, clouds hang steadily there as over mountain peaks, and such birds as we have noticed

moving south have come from that direction. To-day numerous small flocks of phalaropes (perhaps one hundred all told) winged their way to southwest from northeast.

September 3d, Friday. — Observations to-day obtained place the ship in latitude N. $73^{\circ} 52'$, longitude W. $176^{\circ} 51'$, showing a drift since September 1st of six and eight tenths miles to N. 37° W.

September 5th, Sunday. — One year in the ice! and we are only one hundred and fifty miles to the northward and westward of where we entered it. If a time ever comes when I can sit down quietly, free from the mental strain I am now undergoing, I dare say I shall be able to describe in some coherent style my thoughts and feelings; but at this moment I have neither power nor inclination to mention them at any length. Anxiety, disappointment, difficulties, troubles, are all so inseparably mixed that I am unable to select any one for a beginning. Articles of War, muster, inspection, and church as usual for the first Sunday in the month. Our windmill is brought into use again, as we have a wind strong enough to run it.

September 6th, Monday. — We have been treated to a spell of refreshingly low temperature, maximum 27° , minimum 17° . This, I suppose, may be termed our Indian summer! And if so what is an Indian winter? Everything is frozen as hard as a flint, and the little streams and ponds over which I used to scull or row the dingy are now covered with ice almost strong enough to bear my weight. If this continues we shall have to commence fires again on the berth deck and in the cabin, for it is but cold comfort surveying an unlighted stove.

Observations obtained to-day show a drift since the

3d of twelve and one quarter miles to S. 28° W. I suppose we may now say good-by to the Pole or the Northwest Passage. With us it is now another winter in the pack or a failure. If we get the ship in open water again, it is a question of our ability to keep her afloat.

Our pumping to-day is done by hand at the quarter deck bilge-pumps, both of which are kept going to prevent their freezing. Our deck-house progresses towards completion in its new position, and already affords a shelter to our men while engaged in thrumming a sail ready to put under our bows, if we ever get afloat again.

At ten P. M. the effect of the changed wind was heard in the motion of the young ice to southwest, which split and cracked with the old familiar noise as the heavy ice got under way. Mr. Collins, on coming in from the lead to the northeast, reported the ice in motion about eight hundred yards from the ship. Our trouble may commence earlier this year than last, therefore.

September 7th, Tuesday. — Another day of refreshingly low temperature, maximum 27°, minimum 16°; it is enough to make one heart-sick. This is worse than Weyprecht and Payer, for before a second winter stared them in the face they had a newly-discovered land in sight, had landed on it, and looked forward to its exploration in the ensuing spring. We have seen nothing, done nothing, and, so far as human judgment can foretell or the human vision foresee, we shall see nothing, do nothing but battle another winter with the pack. If the coming winter's temperature may be judged by that of the early fall, we are in for some hard experience. However, never say die! Who can tell what Providence has in store for us? Dark as our future seems to be, the light may be getting ready to shine through.

The work on our deck-house being so far advanced that we were ready to shut in the after end, the steam-cutter was hoisted out and hung up at the port cutter's davits, the cutter going to the dingy davits, and the metallic dingy to the ice. The sail for the forefoot is finished to-day, and is now thrummed and ready for use. Fires were started on the berth deck and in the cabin this afternoon, the low temperature inducing me to add thus to our general comfort.

September 8th, Wednesday. — We seem to have reached the bottom of our low temperature for the present. At six A. M. the thermometer ceased going down, and at midnight we had the comfortable figure of 25.7°.

All the ponds are covered long since with ice, and one can walk all around our neighborhood without getting his feet wet. I had a piece cut out and measured to-day, and it was found to be three inches thick. This is formed since the low temperature of the evening of August 30th.

September 9th, Thursday. — It seems we are to have a spell in the cold snap, for to-day we have had an agreeable change in the temperature. The weather is, however, dull and gloomy, no sun appearing long enough for me to obtain observations.

Ice three fourths of an inch in thickness formed since nine A. M. yesterday over the water which was left when the three-inch block was cut out.

We have again arrived at the end of sufficiently pure ice for cooking and drinking, and as I was regretfully obliged to order the resumption of distilling, the steam-cutter's boiler was again called into use. A large patch of crimson snow was found about one half mile ahead of the ship, and a handkerchiefful brought in by Mr.

Dunbar. I have had a quantity of it put away in a jar for carrying to the United States. Our liquid compasses seem very sensitive to cold weather. This morning the spirit was found oozing out around the edges of the glass covers. I had the compasses removed from the binnacles and stowed below.

September 12th, Sunday. — One more week is added to the long and weary round of weeks which records our imprisonment and drift, and we seem as far from liberation as ever. There is nothing I know of more wearing than waiting, — waiting without a chance of relief visible. Are we to be blamed if we find a year of such a life monotonous? Or is it to be wondered at that we do not welcome the beginning of a second year of the same thing? I say a second year, but not a last year; for as far as we can see ahead and judge of the future by the past, there is no good reason for this condition of things to change this side of eternity. We may pass away and our ship may be among the things that were, but I calmly believe this icy waste will go on surging to and fro until the last trump blows. But it is a long lane that has no turning, and our troubles may be approaching a relief. I hope they are, for I am becoming weary of the load of cares and anxieties I have so long carried about.

At ten A. M. I inspected the ship, and after this read divine service in the cabin, with Chipp, Melville, Dunbar, and the doctor as my congregation. Although there is no fear of my taking up a collection, a larger attendance is rare.

September 13th, Monday. — The new week seems to promise but little. Observations to-day show a drift since the 10th of six and eight tenths miles E. Considering the almost steady S. W. or N. W. winds which we

have had, I am surprised to find we have made so little easting.

September 14th, Tuesday. — The arrival and departure of one more day to record, and that is about all.

At eight P. M. the moon was rising on the southern horizon, and very much distorted by refraction. It seemed of immense size four days before full moon, and reminded one of a large city burning. Auroral flashes shot up from the eastern horizon toward the zenith, and, with the many stars visible, made a beautiful scene. At midnight, on going out to make the meteorological observation, I was considerably startled. South south-east of the ship, right ahead, the sky at the horizon was lighted up as by a coming daylight, the clear bright light being very marked. I knew, of course, it must be an auroral display, but while I looked a brilliant green, and then a brilliant red color spread all over it, very much as different colored lights are made to shine on a stage in spectacular pieces. As a scenic effect it was grand indeed. The changes were vivid and instantaneous, and had we been in open water I should have declared that the occurrence was due to signal lights from a ship. But alas! open water, if any such thing exists, must be many miles to the southward of us. I say "If any such thing exists," because I should not be very much surprised if the ocean had frozen over during the summer down to the equator.

Sweetman and Nindemann having finished the deck-house commenced to-day the erection of an inclosing porch around the cook-house, while the crew nailed canvas on the outside of the deck-house and the bows.

September 15th, Wednesday. — A regular stormy day of wind and snow. Until about five P. M. such clouds of snow were whirled through the air that our sur-

roundings at a distance of one hundred feet were as invisible as if they were in another world. Drifts into which one might flounder to his waist were as common as water holes used to be a month ago; and between them bare places of ice, worn as smooth as glass by the friction of the snow blast, caused heels to fly up without warning or avoidance. Looking to windward was a sheer impossibility. Even the dogs, usually so indifferent to weather, were cowed, and after vainly seeking for a shelter under the ship's side, or to leeward of a barrel, fairly gave it up, and lay down in disgust to be snowed in. Mounds here and there showed for a time where a dog was buried, but after a while these became so indistinguishable that it was only when somebody fell into or over them, and caused a smothered howl from the dog beneath, that the dog's presence was betrayed. All fighting was suspended by unanimous consent. We human beings remained carefully housed. We stood the cold until noon, when I directed fires to be lighted on the berth deck and in the cabin, and, seeing no let up in the severity of the temperature, continued them during the night. Temperature, maximum, 19.5° ; minimum, 9.5° . We are having an early start to our cold weather this year, and though we are sufficiently seasoned to go without fire as long as the air outside remains above 20° , we are a little chilly when it gets below it. 40° seems to be the turning point inside the cabin. At 40° or over we are comfortable, but at 39° we commence to feel chilly. While the open air is 20° or so, we seem to generate heat enough to keep the cabin at 40° by our personal radiation, and at 43° or so, and even 46° , when the lamps are lighted at night. But otherwise we fall short of the requirements of comfort. No carpenter work being possible, we employ the men

in breaking out the forward store-room, getting all our pemmican up ready for an emergency, and then restowing.

At nine P. M. a very beautiful lunar halo formed, and remained at midnight, the segments of a circle having prismatic colors. At 9.30 an auroral curtain arch south of zenith and 30° in altitude, extending from southeast to northwest, was visible, and at eleven it had crossed the zenith and stood at 20° above the northern horizon.

September 17th, Friday. — Latitude N. $72^\circ 30' 12''$, longitude W. $176^\circ 30' 15''$, showing a drift since yesterday S. 22° E. six and three fourths miles, — a somewhat curious result, for our gale had about blown itself out without any marked change occurring in our position, and here we go away to the southward at a great rate. Occasional fog indicating ice openings, soon turning into snow.

September 18th, Saturday. — A cheerful little fall of temperature to 3.7° makes this day exceptionally disagreeable, and seems to make assurance doubly sure that we are frozen in for another winter. Not a vestige is left of the many little ponds and streams which such a short time ago might be seen in our neighborhood; on the contrary, what with snow-drifts, and the freezing over of all water, one could readily believe that water had never been here at all. The ship looks as if she had been here always, and, what is worse, intended to remain. Excellent observations to-day show a drift since yesterday of two miles to N. 35° W. And so it goes, — one day southeast, and the next day northwest zigzag, zigzag. The lead two miles ahead of the ship (southeast by south) is opening again, and, being visited by our hunting parties, two seals are brought in.

September 19th, Sunday. — The arrival of another

Sunday brings around another inspection. The deck-house being finished, except its entering porch, and the wing porches to the galley-house being completed, I am able to form some idea of how our coming winter is prepared for. I am convinced that the changed deck-house is an improvement. The berth deck is, of course, somewhat darker, but it is also much dryer, and I think will remain so. This morning's inspection reveals the fact that the two rooms opening off the berth deck (and occupied on the starboard side by Lee and Bartlett, on the port side by Cole and Sweetman) are acting as the condensing chambers for the whole deck. This is bad; but Chipp suggests placing a stove on the old galley platform, and by heating that portion of the ship prevent the condensation, and force it to the cold roof of the deck-house above. This involves moving Alexey's berth, but as his trouble generally consists in finding his sleeping-place too warm, he will be improved by building his berth up in the deck-house. I therefore approve of the stove being placed there, and during the coming week the change will be made. I think we might burn all the coal in the ship this winter without making the house as comfortable as the berth deck (because the heat would melt the frost and cause it to drip without drying it and making it disappear), while with a fire on the berth deck, and another on the old galley platform, a steady heat will be maintained, and its ascending columns will carry up the moisture to the roof of the deck-house, where it will be condensed and will remain. By this means the two decks should be kept dry: for although the temperature of the deck-house will be comparatively comfortable, it will not be high enough to cause dripping; and the berth deck, being uniformly warm, will present no cold surface (ex-

cept the ship's side) for condensation. Should we get a large enough snow-fall, heavy banking may make a warm jacket for the ship outside. The galley-house, being protected on its sides by two porches, will be padded on its forward end with the felt used in the deck-house last winter. The after end, being next the galley, will not require any protection, I imagine, but should it be found necessary will be supplied.

And so we prepare for our second winter in the pack. Our sleds are yet to be arranged, provisions piled on deck ready for an emergency, our worthless dogs got rid of to save dog food, and our wardrobe generally overhauled and made ready.

This item of dog food is a serious consideration. Thus far we have got along well enough with the help of a few walruses, seals, bears, etc. Fortunately our dogs are not fastidious, and are willing to eat anything, and failing that even, to go without. For the emergency of travel, we have saved forty days' dried fish, and of course cannot use this otherwise. To-day we (men and dogs) have eaten our last piece of bear, and we have only about half a dozen seals in the larder as our stock of fresh meat. Bears have been scarce, and but few seals are brought in; not many are seen, and of those shot, a large proportion still sink. However, we have not been out of fresh meat as yet, and have no reason to complain.

The thing that gives me more concern and anxiety in connection with our winter preparations is the readiness for a sudden abandonment of the ship in case of disaster. This is exceedingly difficult to arrange for. To place sleds and boats, or sleds only, on the ice, and pack them ready for use, involves the danger of losing them should a sudden opening occur. If we keep the

sleds packed on board ship, the quick debarking of such heavy weights would be difficult, if not impossible, without damaging them seriously. If we do neither, but have everything handy for heaving over the side, and pack afterwards, our emergency may be so sudden that we shall not have time to save anything. In any case the impossibility of being ready for anything and everything is settled. No matter which plan might be adopted, our emergency, if it came, might make me wish I had adopted another. So as feasible a plan as any will be to have sleds, boats, provisions, dog harness, sleeping-bags, knapsacks, etc., as accessible as possible. Stick to the ship as long as she will stick to us, and when she is ready to leave us try to be a little readier to leave her. I dislike to dwell on the idea of abandonment, and even dislike preparations for such a step. We have come through so much, it gives me hope of our surviving more. As long as enough of the ship remains to shelter us it is preferable to camping on ice; and I can conceive of no greater "forlorn hope" than an attempt to reach Siberia (say two hundred and forty miles) over the ice that surrounds us, and with a winter's cold sapping one's life at every step. Of course, if we were to lose our ship I would make the effort to get there, but the chances of success would be extremely problematical. Divine service was performed after inspection.

Weather generally clear and pleasant from nine A. M. to three P. M., cloudy and dull the remainder. In the early morning light snow, and after three P. M. fog—resulting from a reopening of the old lead which made our floe an island. I am very much afraid that our expenditure of fuel this winter will be much greater than last winter. We are coming to much fine dusty stuff,

a Nanaimo coal, which burns like powder, and requires a large quantity to generate heat. Last winter we had much anthracite coal in our daily issue, and that lasted longer and did better work.

September 20th, Monday. — The cold weather we have been experiencing warns us that we can no longer run the quarter deck bilge-pump without incurring the risk of freezing and bursting it. Accordingly, this afternoon we cease to use it, and fall back upon the forward spar deck bilge-pump, which, being covered by the deck-house, is protected from freezing. With the stove on the galley platform, as proposed, I hope to keep it from freezing all winter. To bring this pump into play the flood-gates in the water-tight bulkhead are closed, and the water allowed to bank up until at a height of seven inches it may be drawn by the pump. Some little water finds its way aft into the fire-room, and is pumped out from time to time by the steam-cutter's boiler, driving the altered main engine bilge-pump. Our distilling being done between four P. M. and three A. M., we can pump during that time, when necessary, letting the water accumulate during the day (amounting to five inches probably), as just now it will not freeze and do damage. We shall have to consider carefully whether the steam pumping increases our coal expenditure or not, for if it does, we shall have to pump this small amount of water by hand, altering back the main engine bilge-pump for that purpose.

By observations to-day a drift since yesterday of four and a half miles W. by S. is shown.

The carpenters commenced building a porch outside of the deck-house door, using portions of the observatory for that purpose. When our winter housing is

complete we shall have quite a village on deck. There is no doubt in my mind of the superiority of wooden houses and porches to tent awnings and hatch covers, and the benefit to be gained compensates doubly, I am sure, for the inconvenience and lumbering up the deck while making the passage from port to winter-quarters.

If I could have known before sailing from San Francisco all that I have learned during the past year, I think I could have brought about a more comfortable cruise and have saved myself much mental annoyance.

September 21st, Tuesday. — A day of magnificently bright weather, but also of low temperature. Maximum, $15\frac{1}{2}^{\circ}$; minimum, $1\frac{1}{2}^{\circ}$. Evidently we are going to have a cold winter. September only two thirds gone and a temperature nearly zero. Each day our chances of liberation seem to grow fainter and fainter. It requires a disposition more sanguine than natural to gather any comfort, or indulge any hopeful sentiment, while regarding the icy waste in which we are located. Alas, alas! the North Pole and the Northwest Passage are as far from our realization as they were the day the ship left England; and my pleasant hope, to add something to the history of Arctic discovery and exploration, has been as ruthlessly shattered and as thoroughly killed as my greatest enemy could desire.

I frequently think that instead of recording the idle words that express our progress from day to day I might better keep these pages unwritten, leaving a blank properly to represent the utter blank of this Arctic expedition.

Our pumping, however, goes on with commendable regularity. We have proved by actual demonstration that it requires an expenditure of an additional twenty-five pounds of coal per diem if we use the steam-cut-

ter's boiler to pump out such water as filters aft into the fire-room through our water-tight bulkhead. This we cannot stand, and I direct that hereafter pumping be done by hand. This necessitates the altering back again of the main engine bilge-pump. We are acquiring a thorough training and education in the art of pumping at all events, and I dare say any one of us could write a valuable paper entitled, "What I know about Pumps."

A low fog rests all the afternoon on the southwest horizon, and the sky otherwise is very nearly cloudless. At midnight there was not a speck of cloud in the heavens, and the most beautiful effects were created by a bright moon and starlight illuminating the floe and the ship, every spar and rope of which was so thickly covered with snow and frost feathers as to be simply a wonderful sight, while northeast to southwest, about 15° above the southeast horizon, extended an irregular curtain-like arch spreading at its southwest end into large patches of a most vivid sea-green. Imagine the ship standing out in bold relief against these large green patches, every rope the size of my arm, with soft down-like fluffy frostings, and the bright moonlight showing their pure whiteness to double advantage, and my feelings may be understood when I thought such a sight was worth coming for.

September 22d, Wednesday. — The early part of the day was marked by the lowest temperature so far in the month, 0.5° , but I shall not be surprised to find it go much lower before September 1880 is a thing of the past. In fact I have ceased being surprised at anything. This kind of life begets a careless sort of feeling as to what may happen, and a lazy belief that time is of no value whatever. Knowing that our surroundings to-day are the same as yesterday, we see no rea-

son for anticipating a change to-morrow. With certain duties assigned for certain hours, we move along mechanically, satisfied we can do no more and naturally unwilling to do less. Deriving our motive power from the food we eat, we perform the operations of breakfast, dinner, and supper as a duty rather than as an enjoyment. With even a liberal variety of food, we know exactly what we are going to eat and how much, and when we are going to eat it, and hence have no novelty in that respect. Eating, sleeping, and performing duties which are as regular as time and as invariable as one day succeeds another, no calculation is necessary, no one heeds the arrival or departure of a new day or a new week. A prisoner in a jail has an advantage over us; for knowing his sentence he can fix the date of his release, while we know "neither the day nor the hour."

To-day Melville changed back our main engine bilge-pump to a piston-pump as before, and arranged it so that it could be worked by hand. To use the steam-cutter's boiler for pumping as well as distilling requires more coal than I think we can afford. Our carpenters were at work felting the forward side of the galley-house, using all of the felt which remained serviceable. The sides being protected by the porches, I think we have made the cook-house habitable, and our cook and steward seem as pleased with their habitation as if it were on the banks of the Yang-tse-kiang. We have such treasures in them as no previous Arctic expedition had I am sure. Our next work is to build Alexey a house inside the deck-house, and then our township will be ready for a charter.

If it had not been for an occasional fog obscuring everything, we should have had an entire bright and

cloudless day. Observations show a drift since yesterday of five miles to S. 71° E.

Yesterday I went into winter-quarters by closing the door leading out of the forward part of my room, and opening the one leading into the starboard chart-room.

September 23d, Thursday. — A somewhat agreeable change from the low temperature of yesterday, maximum 26° , minimum 14° ; and although not up to fever heat by any means, still it is acceptable, as giving a little variety. A very few lines will serve to record the events of to-day. By observations we have drifted since yesterday two and one quarter miles to N. 23° W.

September 24th, Friday. — 9.45 A. M. the ice opened at the old place about a half mile astern of the ship, the lead extending a short distance northeast and southwest. We got a seal by this occurrence, a much desired addition, for our stock is running low. Mr. Dunbar also saw a walrus, but too far off for a shot.

It is well worthy of mention that during the whole summer (and spring, too) in all the leads, openings, etc., we have seen no white whales. Last fall, after becoming beset, whenever we made excursions to the few lanes in our neighborhood, it was not uncommon to see a white whale blow; and Mr. Dunbar, whose experience makes him an authority, argues from that fact that now we are far removed from the open sea. Walruses and seals will go readily into a pack, and dive if necessary, swimming a distance under ice from hole to hole should there be no surface connection; but the white whale, unless chased, will not go so far into the pack as to jeopardize his easy return to the open water.

September 26th, Sunday. — One more week come and gone, and here we are yet! The usual Sunday inspection is made, and I am much pleased to find that

the dampness has altogether disappeared from the berth deck. In fact, it is drier than it has ever been, winter or summer, since we came within the Arctic Circle. Alexey's house is already occupied by him, and the stove is in place on the old galley platform.

September 28th, Tuesday. — The usual monotony of our lives was broken in upon to-day by the appearance and capture of a large bear, and it is such a welcome addition to our larder that its acquisition deserves more than a passing mention. Early this morning our "hoodlum gang," Prince, Tom, and Wolf, made an attack upon a valuable dog, Jim, and nearly ate him up before they could be driven off. The doctor fortunately saw them and went to the rescue, or we might have been minus a four-footed friend. These hoodlums have inaugurated a reign of terror among the pack. If a single dog strays away twenty feet from the ship, they pounce down on him like a hawk on a chicken, and proceed at once to "chew him up;" and as they are generally describing uneasy circles around the ship, they make the entire neighborhood unsafe for stragglers. The whole pack seem to be afraid of these three dogs, and cower alongside of or near the gang-plank ready for a retreat. Religiously shirking work, the "hoodlums" object to other dogs working, and attack them if they do work. We have anchored them and tied them up until their howling became a nuisance, and we had to release them in self-defense; but they were as intractable as ever. On this occasion it was determined to tie large blocks of wood to them, to hamper them in running away from work, and make their fighting qualities somewhat less obtrusive. Getting ready the blocks was one thing and attaching them to the dogs another, for suspecting evil the "hoodlums"

became impressed with the importance of looking at the ship from a distance, and departed incontinently. At eleven o'clock they were observed to be suspiciously alert, and Mr. Dunbar, who was on the fore yard, sighted a bear about a quarter of a mile from our starboard bow, to which these hoodlums at once gave chase. The alarm at once spread. Out rushed Mr. Collins, Wilson, Sharvell, Ericksen, Mr. Dunbar, and half the dogs. Of course the bear turned and ran, and being out of range already I concluded his pursuit would be another of the stern chases which we have had without result. But the "hoodlums" stuck to the game, and at one third of a mile from our starboard beam came up with Bruin, and, yelping and dancing around him, so disorganized his retreat as to make him wheel in circles, charging at one dog and then at another, until so many more dogs came up as to hold him at bay. Then selecting a kind of well between hummocks he made his stand, until Mr. Dunbar coming up stretched him out with a bullet in his side and another one in the neck. Upon examination afterwards we found that Dunbar's first bullet had gone through the heart, cutting away the lower end of it, and it explained why the bear had not again risen upon tumbling at the first shot.

Bruin was a perfect beauty! As he lay upon the ice on his belly and spread out, with his nose on his front paws, he seemed as if asleep. Little or no blood was on the surface of the ice, and the yellowish white of the fur stood out in all its richness, while so fat was the carcass that every curve of the body was as fully developed on the coat as if he had been cut out of marble.

In a triumphal procession he was dragged home on a sled, the "hoodlums" making a fine distinction between chasing a bear while alive and dragging him when

dead, by declining to be caught for harnessing. Following on the wings of the procession they saw the carcass laid out for cutting up, and then, falling victims to their stomachs' cravings, they came near for the scraps, were caught, the blocks of wood hung to their necks, and thus weighted set at liberty. But soon after, as if to show they were not subdued if burdened, they gave chase to their prey of the morning, and caused him to make his best time on record in covering the short distance remaining to the gang-plank. The dimensions of our prize were as follows: —

Length from tip of nose to end of backbone equals	7 ft. 4 in.
Length from tip of nose to end of tail	7 ft. 11 in.
Girth abaft fore shoulder	5 ft. 9 in.
Girth of fore leg below shoulder	3 ft.
Girth of hind leg below shoulder	4 ft.
Length of fore leg below shoulder	3 ft. 6 in.
Weight before skinning and dressing	94 $\frac{1}{2}$ lbs.

Such an addition to man and dog food is well worthy of a page in my journal.

In accordance with my custom, the skin and head go to the captor, Mr. Dunbar. He very generously gave them to Melville, who intends putting the skin in pickle and presenting it to Engineer in Chief Shock, upon our return to the United States. Otherwise the day was as all other days with us.

September 29th, Wednesday. — Another of our dogs has fallen a victim to swallowing a bone, and of course it happens to be one of our effective dogs. We could very well spare one of the half dozen old skeletons that would not grow fat if they ate forever, but they seem to have a hold on life that nothing short of a bullet can loosen. I cannot distinguish the defunct by a name, for to me he has had none, though the men may have chris-

tened him. The usual post-mortem examination by Iversen disclosed a bone lodged crosswise in an intestine, and the usual cutting of that article.

The cracking of a pipe leading from the steam-cutter's boiler through the steam-pipe to the water-cask resulted to-day in spoiling half a cask of water for us, by carrying along salt-water from the feed tank. We had used the water at dinner before the trouble was detected, and have consequently absorbed a certain quantity of salt in our systems, but nothing to be alarmed about I imagine. The most serious feature was the enforced expenditure of twenty-five pounds additional coal to carry on the distilling for the day after the pipe was repaired.

September 30th, Thursday. — Another bear! — I suppose one of these days in the future I shall smile at reading such an imposing manner of describing a very ordinary occurrence; but just now, where it means not only fresh meat for men, but daily food for dogs, I feel that I cannot make too imposing a heading.

About 3.30 P. M. the man on watch came in the cabin and quietly announced the stranger. Rushing out with my rifle I saw Bruin making away over the hummocks, about three hundred yards ahead of the ship. The dogs did not see him, nor for a time could they be made to see him; but noticing my excitement, they danced along before me in great glee. At first I led the chase, but being short-winded, and unused to running in such drifts as the snow had made among the rough ice, I was soon passed by Dunbar, Alexey, and Anequin, and, easing up my gait, by Newcomb and Wilson. Alexey's dogs for a long time could not make out the bear either, but when they did see him they tore along in such fine style, that, at the distance of one mile ahead of the

ship, they caught up with him and held him at bay. Mr. Bear took refuge on top of a hummock, while his persecutors surrounded him, looking like all possessed, and dancing around like a monkey in his confusion. Alexey and Aneguin reached the spot first, and fired. Off the hummock tumbled the bear, and literally fell on the dogs beneath, Tom and "Alexey's brown dog" getting each a slight touch from his claws. A few more shots finished him. When I reached the spot he lay dead on his back, with his left fore-paw thrown across his breast, as pretty a sight as one could see in the Arctic regions. With wonderful self-denial Dunbar had held his fire, and tried to get the Indians to do so (but being at a distance they did not understand him), in order that I might come up and have the honor of killing. However much I felt the intended compliment, I was too well satisfied at the addition to our provisions to feel any annoyance at my failing to enjoy it. Melville came out with the sled, and we dragged our prize home, where we found it to weigh 469 pounds. This marked the day as eventful. Our "hoodlums" started off in fine style for the chase, but Wolf stumbled so often with his block of wood that he turned back in disgust, with a look that said plainly, "You may catch your own bears hereafter." Tom kept on, occasionally stepping on his block, and turning head over heels, and reached the scene just in time to have the bear fall on him and plant a claw in him. We removed the block as a reward, and as he of course declined to haul in the carcass, he rejoined his gang in time to meet and fall upon Alexey's dogs and thrash them for their zeal, thus no doubt easing his mind for the day.

A careful measurement of ice-thickness shows that seven inches have formed since August 31st.

I nearly forgot to mention a very pleasing occurrence, the discharge of Kaack from the sick-list and his return to duty. It is not only a gratifying result to him, but well worthy of mention in connection with the general condition of health of all hands. As his injury consisted of a broken bone, any defect in his constitution arising from his life in the ice would make itself apparent by a slowness in healing. If, for instance, anything in his food, drink, or surroundings had given him a scorbutic taint, an infallible proof would have been given by the bone of his arm uniting slowly or badly. But the process of union has gone on regularly and promptly, and the doctor tells me the cure has been effected in the same time that would have been necessary if the accident had occurred on shore in the ordinary course of events.

Another proof is presented in the gunshot wound of Alexey. This healed promptly, and the hand is as serviceable as ever. And if further proof were necessary, we can refer to Danenhower's case. For nine months has he been under severe treatment, involving operations, confinement in a dark room, deprivation of exercise, and at times shortening of diet. But though weak and emaciated, he is as free from scurvy to-day as if he had remained in America. In all our trials we have something still to be thankful for.

October 1st, Friday. — After all the space devoted to yesterday, it seems like a shame that it is necessary to use only a few lines for to-day. But so it is. Our eventful days are like rare oases in a large desert, and we would like to hurry over the vast wastes intervening. House down the quarter deck awning for the winter. In the afternoon I went out with Mr. Dunbar, Alexey, and Sharvell, and we set the bear-trap, about

two miles southwest of the ship, baiting it with a seal, and we shall now stand by from day to day for a capture.

October 2d, Saturday. — Mr. Dunbar, the natives, and I visited the bear-trap to-day, but found everything undisturbed. The trap and its surroundings had the same general dreariness, which is so painful on board and around the ship. Such a waste as this ice-field is nowhere to be seen out of the Arctic. Not a sound breaks the monotony. Not a bird is seen from morning till night; and but for our own voices to hear, and our shipmates to see (and neither the one thing nor the other is a novelty), we might easily imagine that the world had come to a stand. I can easily believe that this state of affairs always has been and always will be; and somehow or other it is not difficult to suppose that I have never been anywhere else. The regularity with which days come and go, the unchanged character of our surroundings, the mechanical sameness with which we live, eat, drink, and sleep, all go towards lulling the mind when it tries to remember any other situation in the past, or anticipate anything different in the future. That there are others in the world living in bustle and excitement we do not yet doubt, because a little over a year ago we saw them; but I am well satisfied that if we held together for five years we should not believe it. Whether this is a natural sequence of our utter stagnation or not, I must leave to others to decide. We are not lethargic to an irremediable extent, however, and if the ice were to open, we would jump quick enough to get the ship under way.

October 5th, Tuesday. — At six A. M. Chipp heard a grinding of ice to the eastward, and I suppose we shall have the satisfaction now of waiting for the repetition

of the anxious times of last winter, not knowing how soon we may have pandemonium around us. In order to provide for any emergencies we can do nothing more than getting provisions on deck, convenient for heaving on the ice, and we therefore devote the day to this occupation. Pemmican, bread, tea, sugar, cooking-stoves, alcohol, tents, and sleeping-bags are all that we can hope to be able to drag should we have to leave the ship, adding, of course, our knapsacks, medical stores, instruments, arms and ammunition, and our records, and if we can get over the two hundred and fifty and odd miles between us and Siberia with this load we shall do well.

October 6th, Wednesday. — Hardly had Kaack received his discharge from the sick-list than he is back again. To-day, while moving around the spar deck in the deck-house, he slipped and fell, striking on his right elbow and again fracturing the olecranon process. As the recovery this time will be a more tedious operation than before, we cannot count on his being all right again in six weeks.

Commenced to-day banking up snow against the ship's side. If we are to be located in the pack a second winter we may as well keep all the heat inside the ship, if possible, instead of radiating it through the side. In order to prevent the freezing of our forward pumps, we have to keep a fire in the stove on the galley platform at night, and that adds to the demand on our diminishing coal pile.

The difficulties under which we labor, the knowledge that we have done nothing, and the virtual impossibility of doing anything but retreat should the ice open (which it certainly shows no signs of doing), are almost enough to make me tear my hair in impotent rage.

October 7th, Thursday.—We continued to-day the banking up of snow against the ship's side. Daily visits to the bear-trap have thus far been unproductive of results, not even a track being found. Morning and afternoon our hunting parties go out and entirely circumnavigate the ship at distances varying between two and four miles, and do not see so much as a feather. No water, no seals; no seals, no bears; and evidently no bears, no foxes; no foxes, no birds. We are all alone in the midst of a (to us) measureless frozen ocean, the only living things in the deathly waste of the north. The days are so much alike that we almost lose track of them, or rather fail to notice the date. Man is but a superior kind of machine after all. Set him going, and keep him wound up by feeding him, and he can run monotonously like a clock, at least we do, and I do not think we are exceptional creatures.

Dull, leaden sky, gloomy as a dungeon to look at, and an almost steady fall of light snow.

October 9th, Saturday.—The ice is yet ready day after day for contemplation, and is as unchanging as the laws of the Medes and Persians. Not a sign of a bear-track, and the bear-trap was never so carefully set, nor the scraps of seal laid around it more innocently. But even bears seem to have left this locality to itself.

At eleven P. M. a slight disturbance occurred among the dogs, and it led the quartermaster to believe there was a bear within hail. In fact he thought he saw Bruin ahead of the ship, and he called me promptly from my reading. I rushed out, and though the dogs took my appearance with my rifle as a sure sign of a hunt, they could find nothing, nor could I discover any traces.

A dull, gloomy day, enough to make a man blue to

endure it. Dull, leaden gray sky, no sun, and that exasperatingly light fall of snow which is neither one thing nor the other.

October 12th, Tuesday. — Gloomy and dull as a funeral. Not a sight of the sun, and not a star. Really it is such a long time between observations that we have plenty of time to get lost.

October 13th, Wednesday. — Nothing unusual occurs to mark this day over any other. But I observe one little circumstance which I cannot account for until time or some future occurrence give a clue. While standing alongside of the ship, on the ice at the fire hole, abreast the port cabin door, I noticed a bubbling of the water in a free place, as if some seal, for instance, had just gone under. In a minute it had subsided, and the surface was smooth again. In five minutes it recommenced, lasted for a short time, and again ceased. I should not have attached any importance to it, or, perhaps, might have remained satisfied with the belief that it was caused by the discharge from the main engine bilge-pump, but Mr. Dunbar, who came in from an opening ahead of the ship, described the rising and falling of water in a small hole he saw, as if acted upon by a swell of the open ocean, and while the previous occurrence then came again to my mind, I asked myself, "Can it be possible we are approaching open water again?"

Mr. Dunbar brought in three seals, having shot and lost two more, and mentioned having seen a new bird, with red and black feathers, which tried to alight on a seal the natives were dragging. The party having only rifles with them fired at the bird, but without effect.

October 14th, Thursday. — One more day comes and

goes, and finds and leaves us in the same situation as ever.

The new location of the deck-house gives daily more and more satisfaction with respect to dryness, for it is marvelously clear from all moisture. But we must now watch for a new enemy, carbonic acid. The doctor tests it regularly every Sunday night, and his last experiment shows too large a quantity for perfect health. It will be by our constant efforts only that we can accomplish a proper condition of things, in spite of these two great enemies, — moisture and carbonic acid. Sailors, as a rule, confound ventilation with draft, and though they will unhesitatingly and without noticing it, live, eat, and sleep in an evidently impure atmosphere, they promptly complain of cold when a change of air is permitted. With a stove on our berth deck lighted during the day, and the one in the galley-room lighted during the night, with the deck-house covering the entire deck, there can be no question of a proper amount of heat being distributed. By keeping the forward skylight always uncovered, and the occasional opening of the berth deck doors during the day for ingress and egress (not to speak of the deck being cleared for inspection), the accumulation of moisture in the air of the deck is carried up into the deck-house and deposited on its cold roof and sides. So far, we are fortunate. But a fresh supply of air must be given the berth deck from time to time, and we find that the occasional opening of the deck-house door does not accomplish this. Therefore I have directed the trap-door in the roof of the deck-house over the skylight to be kept open six inches or so whenever a snow-storm is not raging, and in order that the carbonic acid may not bank up on the after part of the berth deck, the berth deck doors are ordered

to be opened, and kept open after ten P. M. Promptly the complaint of being cold is made, though the air does not move along the berth deck a mile an hour I am sure. But, by serving out some seal-skin blankets, additional cover is given, and the complaint ceases. As a further effort to reduce carbonic acid, since last Sunday's observations I have ordered the berth deck doors opened at and after nine P. M.

Beginning on September 1st, I have instituted the practice of serving out two ounces of rum once a week, generally Wednesday night, to all hands. This I consider a good thing, not only because it conduces to sociability, but because it breaks the monotony, and gives something to look forward to. This, and two glasses of sherry at dinner on Sunday, constitute the extent of our tipping. What a country this is, and how monotonous a life we lead, may be inferred from the fact that two ounces of rum every Wednesday are looked forward to as a change and excitement.

October 15th, Friday. — Desiring to get some idea of the amount of air passing through the berth deck I took a pocket anemometer down there at eleven P. M. and obtained the following results : —

Starboard door sill = 60 ft. per minute, in (i. e. from aft forward).

Port door sill = 99 ft. per minute, in (i. e. from aft forward).

Skylight hole = 96 ft. per minute, up (i. e. from aft below).

Open air = 570 ft. per minute.

Temperature at berth deck 49° Fahrenheit. Temperature, open air, 10.5° Fahrenheit.

October 16th, Saturday. — The clearing of the sky at midnight last night continued, I am happy to say, giving us twenty-four hours of bright weather, and so

far as can be judged, promises to give us twenty-four hours more. Although the temperature fell to minus 8° , it could not keep us from enjoying the bright sun while it lasted, or the bright moonlight which almost made sunset unappreciable.

I have heretofore made several attempts to describe the beauty of these Arctic winter nights, but have found my powers too feeble to do the subject justice. They must be seen to be appreciated. It is so hard to make a descriptive picture of moon, stars, ice, and ship, and unluckily photography cannot come into play in this temperature to supply a real picture. Imagine a moon nearly full, a cloudless sky, brilliant stars, a pure white waste of snow-covered ice, which seems firm and crisp under your feet, a ship standing out in bold relief, every rope and thread plainly visible and enormously enlarged by accumulations of fluffy and down-like frost feathers; and you have a crude picture of the scene. But to fill in and properly understand the situation, one must experience the majestic and awful silence which generally prevails on these occasions, and causes one to feel how trifling and insignificant he is in comparison with such grand works in nature. The brightness is wonderful. The reflection of moonlight from bright ice-spots makes brilliant effects, and should a stray piece of tin be near you it seems to have the light of a dazzling gem. A window in the deck-house looks like a calcium light when the moonlight strikes it at the proper angle, and makes the feeble light from an oil lamp within seem ridiculous when the angle is changed. Standing one hundred yards away from the ship, one has a scene of the grandest, wildest, and most awful beauty.

We have had other things to contemplate also. The

hunting parties, on going out this morning, found an opening in the ice about two miles southeast and east from the ship, and extending in alternate open and closed spots for a short distance. Where they were closed large ridges of piled-up slabs seven and eight feet thick rose to heights of thirty and forty feet. As this occurred since yesterday, the pressure and upheaval must have taken place during last night. While going out to the bear-trap yesterday with Mr. Dunbar we noticed several cracks along the ice, formed over what had been a lane of water an eighth of a mile northwest of the ship, which lane extended in an arc of a circle, or rather curve, around to northeast on one hand, and west on the other, at distances varying from one eighth mile to two miles, ending at rough and heavy ice-ridges. That ice appeared subjected then to some great strain, and to-day I was concerned to find that the new ice around us was receiving strains and pressure. The hunters — Mr. Dunbar especially — described the grinding and crashing having recommenced two miles ahead of the ship as they turned to come in; and when Nindemann came home, just before supper, he reported that the ice was at work heavily, or, as he expressed it, “the whole ocean was alive.”

During the evening various snaps and cracks were heard around the ship, and occasionally we had a light jar. Going out repeatedly for examination, we at last found crevices and cracks meandering along ahead of the ship under the stern athwart ships, and here and there in other places.

For nearly nine months we have had a rest, and now our old cares and anxieties begin again, to end — when? Our circumstances are somewhat different now, for we have an injured ship, small amount of coal, and hardly

the same vigor that we had a year ago. In anticipation or contemplation of the winter before us, there is but little that can be planned. So far as human agency is concerned we have done all we can do, and must wait and take things as they come. No human power can keep the ice still, and no human ingenuity can prevent damage when it begins to grind and break up. Held fast in a vise we cannot get away, so we have to trust in God and remain by the ship. If we are thrown out on the ice we must try to get to Siberia, if we can drag ourselves and food over the two hundred and fifty miles intervening; sleds are handy, dogs ready, provisions on deck, knapsacks packed, arms at hand, records encased. What more can we do? When trouble comes we hope to be able to deal with it, and survive it! If it comes too suddenly we shall be in a bad plight, and cannot help it. From this time forward care and anxiety will hang on me more heavily than before.

October 17th, Sunday. — The arrival and departure of another Sunday marks the passage of one more week of our imprisonment in the ice. Beyond a sharp crack now and again, and the discovery of several new crevices in the ice, we have nothing to give us uneasiness, and we have a day for “calm repose and contemplation.” Inspection is made at ten A. M. as usual, and divine service is performed at its completion, my small congregation of four, Chipp, Melville, the doctor, and Dunbar attending.

The day is simply magnificent, and the night beautiful beyond description. At midnight the scene is thus described by me in the log, and it was one almost worth the imprisonment accompanying it: —

“At midnight one half of the sky was covered by cumulo

stratus clouds moving from north to south, and at that moment extending from the zenith to the southern horizon, obscuring the moon and the stars (north of the zenith the sky was clear, except a streak of cirro-stratus above a small bank of rising cumulo-stratus). Immediately following the first-named cumulo-stratus clouds, and near the zenith, was a faint auroral arch extending from east to west, with its ends slightly curving to the southward, and hidden by the clouds near the horizon. As the clouds nearly uncovered the east end, a mass of bright green light shot up, and spread like a fan over 10° of arc; and just as the east end was completely uncovered the mass changed into brilliant green, spiral curtains, terminating a bright white arch through the zenith to west. After perhaps a minute, the clouds being well clear of the arch, the light faded and lost colors, and the arch ends straggled back to northwest and northeast, the centre being at the zenith. The moon then became entirely uncovered, the floe seemed lighted as in midday, and but few faint streaks of arches remained, thin and almost indeterminate."

W. N. W. winds, and falling temperature until midnight, when it jumped up from minus 14.5° to minus 7.5° , being mild and pleasant by comparison.

October 18th, Monday.—A day of no particular occurrence worthy of mention.

October 20th, Wednesday.—I do not notice that I am more sensitive to cold this winter than I was last winter, but I am certainly more sensitive to heat. With the temperature of the outside air at 14° or 15° I find it soft and mild, and were it not that my hands break out with chilblains and old frost bites from last winter, I should experience no difficulty in going bare-handed. Of course when I go out on the ice I wear my fur jacket and suit generally, and am well protected. But in the cabin, with a temperature of 50° , wearing ordinary clothing, I am often too warm, and when by accident the temperature runs up to 60° I am

positively uncomfortable. Night after night I sleep with my air port one third open, and yet in the morning find I have slept too warm if anything. However, it is rather early to talk ; we have not had our normal condition of cold yet.

An almost steady fall of small snow particles all day, enough to be driven along the surface ice (gathering salt and being consequently of no use to us), and filling up the spaces between hummocks so completely as to make many traps into which we flounder in our wanderings.

October 21st, Thursday. — Another day has come and gone, and here we are yet ; and the only thing which has disturbed the regular monotony may be described as the stupendous discovery of a fox-track. Upon going out to the bear-trap this afternoon we saw a number of small foot-prints of this little visitor, and we promptly sent back to the ship for a couple of fox-traps for his benefit should he come that way again.

October 22d, Friday. — Continuing up the prodigious excitement of yesterday, Mr. Dunbar and I walked out to the bear-trap to-day to look for our fox. We found he had been there, had eaten up all the small scraps of meat laid out for him, and walked all over the fox-traps without springing them, so we walked back again hoping for better luck to-morrow. Otherwise the day was without event, and so we worry along. The routine is as regular as clock-work, and is carried out with mechanical exactness. If we must spend a second winter in the pack we cannot help ourselves, and must confront it with cheerfulness and courage. We have enough coal to keep us warm (unless some accident requires a resumption of steam-pumping), and food enough to save hunger, and the only thing to be

dreaded is our being turned out on the floe by the loss of our ship, and the knowledge that we have to traverse two hundred and fifty miles to get to the mainland, which may be safely assumed as a humanly impossible task.

October 23d, Saturday. — Our fox is not yet caught, though he visits the place and eats all he can find.

October 24th, Sunday. — Our friend the fox again visited the trap, and this time got caught in it and escaped. Hair and blood and a closed trap were the proofs of his being caught; his absence sufficiently proved his escape.

There is a considerable amount of doubt thrown on all observations taken during such cold weather as we experience in an Arctic winter. Sextants were never designed to be submitted to such contraction as they now undergo in use, and there is no way to allow for or remedy the changes produced in the length of the arc. The greater the cold the greater the contraction of course, but that gives no index error. A sextant very carefully adjusted to-day, and then having an index correction of 30", was found after a short exposure to have an index error of 4' apparently, but how much the arc was shortened it would be impossible to say. The mercury on the index and horizon glasses cracks and splits, and Chipp is kept busy in supplying new backs. For some time, over a month, I have been trying to get some satisfactory lunars to check our chronometers by, but they have all resulted so ridiculously, and no two alike, that I have despaired of getting anything reliable. As another resource I shall break out our zenith telescope, and see if it has power enough to define Jupiter's satellites, by whose eclipses, occultations, or transits I can get chronometer errors. The

way of the Arctic navigator, drifting in the pack, is difficult to determine in winter. Divine service followed inspection. The berth deck was as dry as a bone fore and aft, and it would seem that we have solved the problem, "how to overcome dampness in the living quarters of an Arctic ship."

October 26th, Tuesday. — Our fox is at last caught, and, poor thing, in two traps at once. Mr. Dunbar, on going out to them this morning, found the victim moaning and crying, with one fore leg held in one trap and one hind leg in the other. Dispatching him he brought him in, a fine white fox, plump as a partridge, but not choice enough for eating. Resembling as it did an overgrown cat, the game seemed too cruelly obtained, and Dunbar said he felt ashamed of himself for the capture, though admitting that he had promptly reset the traps! The skin will come in handy for trimmings.

October 27th, Wednesday. — As the winter grows on us, and our daylight fades away to the time when the sun will leave us altogether, our anxieties recommence. All the time of our perpetual day, when we hoped and prayed for a breaking up of the ice to occur, so that we might again attempt to redeem ourselves by some effort, not a sound, not a motion was to be noticed. But now, when a breaking up of the ice can serve no other purpose but disaster, so far as our human judgment can foretell, we seem to be promised enough of it. This morning at daylight a crack or lane six feet in width was discovered on our port beam, about five hundred yards distant. It extended to and joined with what was an open lane an eighth of a mile astern of the ship. (This last-named lane has remained closed or frozen over for nearly three months until a few days ago, when numerous cracks appeared in it, extending

lengthwise, or, roughly, northeast and southwest. These cracks opened on Sunday to a width in some places of eight feet, and to-day they are again closed, a ridge of broken blocks four feet in height marking where the union was made.)

At 11.30 A. M. the ship received a considerable jar, causing the lamp-chimneys and shades to rattle and ring. Most of us were on the ice at the time, and there it was unnoticed by all seemingly excepting myself. I detected an earthquaky movement or two which seemed like a lift and a shove. This, however, is merely a beginning. Next month, if it is anything like last year, will be full of events.

October 28th, Thursday. — Not a sound from the ice to-day, and evidently a period of rest or preparation. Soundings in thirty-one and one half fathoms, and an indicated drift to south.

October 30th, Saturday. — Cracking and noises of grinding commenced just after midnight, the former seeming to be under the stern, and the latter coming from some distance on either quarter. The snaps and grinding lasted until nearly three A. M., and again set in for a short time about three P. M. No evidence of any disturbances could be seen around the ship, though a crack or narrow lane was found about a mile ahead where it has opened and closed before.

At midnight an arch 10° in altitude south, made of curtains of pale green light, with masses of bright green light pulsating across it, made a brilliant auroal display.

October 31st, Sunday. — Another week has come and gone, and with it ends the month. Uneventful, and, so far as any results obtained are concerned, a clear waste of life. It is hard to feel satisfied even with our being

still alive. That, after all, seems such a negative kind of thing — a living with no purpose, an existence without present tangible results, a mechanical supplying the system with food, heat, and clothing, in order to keep the human engine running.

I have often wondered if a horse driving a saw-mill had any mental queries as to why he tramped over his endless plank, and what on earth there was accomplished by his so doing. The saw was generally out of his sight, he perceived no work accomplished, he never changed his position relatively, he worked on and on without advancing a foot, and ended his day's work in identically the same place at which he began it, and, as far as equine judgment could forecast, would do the same thing to-morrow, and every other day thereafter. If that horse had reasoning faculties, I pity him and appreciate now his thoughts and feelings. We are individually in that horse's position — we see no saw, we can detect no work accomplished, we move on without advancing a foot, we shall do to-morrow what we have done to-day and what we did yesterday, and we fill up with oats, so to speak, merely that the saw-mill may not have to suspend sawing. This kind of life is worse than Mr. Mantalini and his mangle. With him life was "one demnition grind," but with us it is "one demnition blank."

A man up here thinks a wonderful amount of nonsense, says many things which he would be surprised at remembering hereafter, and, if he writes, commits to paper many absurdities which he will laugh at afterwards. But to a physiologist, who could retain his own mental poise and strength under these circumstances, the study of human life and characteristics developed by a residence of white men in the Arctic regions would give materials for a very readable volume.

Measurements of the ice thickness to-day gave twenty-four inches, direct freezing since August 31st. Bright, pleasant weather until nine P. M., when it became overcast, and a steady rise of temperature from minus 21° to almost zero.

Inspected, according to Sunday practice, and found everything dry, warm, neat, and comfortable. We have neither cold nor moisture to complain of this winter at all events.

November 1st, Monday. — To-day our winter routine was resumed, whereby our meal hours are changed, and an enforced exercise outside of the ship takes place daily from eleven to one. Though the sun has not yet left us, I consider it well to get the exercise resumed now, for it can do no harm, and it will insure a proper ventilation of the ship during the two hours she is cleared.

I also resume the medical examination of officers and men, and shall be anxious until I get an expression of the doctor's opinion as to our general physical condition.

November 2d, Tuesday. — With to-day we have a new moon, and in prompt accordance with our experience of last year a crack occurs in the ice about five hundred yards north of the ship, in some places six feet wide, and extending to the eastward for a short distance. Beyond an occasional shriek of newly made ice being moved a little, there is no trouble received from the opening.

November 3d, Wednesday. — By Sumner of stars our position is found to be in latitude 73° 44' N., longitude 179° 57' E., showing a drift since October 24th of twenty-five and one third miles due west. As I did not change the date when we went to the westward of the 180th

meridian before, I do not change it now, for in all probability in a day or two we will be east of it again.

Magnificent sunset at 1.45 (shorter and shorter grow the days), presenting a solar circle showing segments with crimson lake tints. At six P. M. a faint arch 10° in altitude to northward; but at nine P. M. the sky was literally covered with brilliant auroral patches and segments of curtain arches, which at times pulsated with pale green light. The galvanometer, with one hundred feet insulated wire extending nearly in plane of magnetic meridian, showed no disturbance, and the auroral light thrown on unsized paper by a mirror showed no effect in the sulphate of quinine spots.

A magnificent large seal, weighing 149 pounds, was shot by Aneguin, and dragged in by "Smike" a good two miles, — a heavy drag for one dog. Aneguin had a ducking, however, in trying to secure the prize. After shooting, he embarked on a cake of ice and paddled out for the seal, but, on nearing his goal, the cake broke under him and in went Aneguin. Swimming to the floe edge he was helped out by Alexey and ran for home, nothing the worse for his involuntary bath. The doctor handed in his report of medical examination. Several cases, such as Danenhower and Kaack, are exceptional, and have received special mention. Of the rest of us the doctor finds nothing wrong except a general want of tone and less vigor than last year. As this is exactly what would result from our life of enforced monotony and prolonged absence from land, there is no surprise to be manifested. Generally we feel strong and well, but have, as a rule, lost flesh. The small change of temperature during the summer months compared with our spring and fall cold weather, and the short time that the respite endured, have not

been enough to allow us to spring up to anything like a normal condition. And we are again called upon to endure cold weather before we have had a decent chance to recover from our last trial. No doubt we shall be able to put in this winter as safely as last winter, so far as our health is concerned, so long as we have the ship as our home. But if we are turned out on the floe by disaster, we shall not be as well able to stand the exposure as we should have been this time a year ago.

The condition of our living quarters, as far as warmth and dryness go, is all that could be asked, and more than any other experience has shown. Ventilation of the berth deck is fairly secured by our present mode, and, were it not for our lamps, I could say the same of the cabin. Last winter while we had kerosene we had light without smoke, but now we are trying to use Walton's lamps, with oil received from the navy yard, and it is a failure. The oil is poor, does not flow readily, and easily chokes the tubes. They cannot always be cleaned, and, in consequence, the light soon grows dim. Turning up the wick makes a tremendous smoke, and turning it down dims the light too much. We have stood the smoke for a while, but it is too great for a continuance, and we shall have to fall back on magazine candles.

November 6th, Saturday. — Our long night has commenced. The sun showed above the horizon to-day for the last time this year, in this latitude, and for ninety days or thereabouts we must be content with our recollection of his looks. He struggled up about 11.30, and at noon was about two of his diameters above the horizon, and about 12.30 said good-by. Well, as far as his heat in thawing ice went he had been of very little use to us this past summer, and his absence is not de-

plored on that account. We shall miss him chiefly when the horrible yelling and screeching of the ice, and its piling up around us and squeezing and crushing, make darkness a more terrible enemy than cold.

Of this last — cold — we had a lively touch to-day. At midday it was minus 30° , and at midnight minus 33.2° , — neither of which figures did we have last winter until January. As last summer was an open (?) season, it will probably be followed by a sharp winter, and I suppose we shall see some cold yet that will make to-day seem a dream of the tropics. The ice commenced screeching at six A. M. in the northeast, and at 3 P. M. in the west. At midnight the sky was nearly covered with auroral loops from east to west, and from northern horizon to 40° south.

November 7th, Sunday. — It is idle to speak longer of the coming and going of weeks — it is record enough when I mention the coming and going of months. The arrival of the first Sunday in the month involves the reading of the Articles of War and the mustering of the crew. The reading is conducted with all the seriousness and decorum that would prevail in a frigate; and the clause, providing that “all offenses committed on shore shall be punished in the same manner as if they had been committed at sea,” is delivered with as much impressiveness as if we were in a port full of sailor temptations, instead of being in a howling wilderness of ice. I think many of us look back to a “shore” as some memory of our childhood, or a previous existence in another sphere. That this world should be anything but pack ice is a tax upon even extraordinary credulity.

After muster we bundled out on the ice. It was all there fortunately, for with our present temperature it

might have melted. Minus 33°. (This is intended for keen irony, but like Danenhower's description of his foot warmer, "a hot brick, in the shape of a flat-iron, made of brass," it may sound somewhat vague and peculiar.) The sun* having left us yesterday, we had the pleasure of judging where he was by a bright red tint in the sky, above the horizon. Just to think that there were people at that moment in our longitude, with the sun in their zenith, who were not happy and no doubt complaining bitterly of the heat. They have no more use for heat than we have for cold.

Inspection showed a perfectly dry and fairly well ventilated berth deck. I say fairly well if compared with perfect ventilation, but remarkably well if compared with Arctic ships in general. Divine service followed at 1.15 P. M.

During the forenoon the ice was found to be cracked between the ship and the thermometer box, and I suppose the time is not far distant when we shall see the ice floating away from us again as it did a year ago. During the day and evening grinding of ice could be heard to the southward, and generally the snapping and crackling of the surface crust.

November 9th, Tuesday. — Observations to-night show a drift since the 3d of nine and one quarter miles to S. 64° E.

To our unmitigated astonishment the sun came above the horizon at noon, some portion of his disc being visible from eleven A. M. to one P. M. Of course this is due to extraordinary refraction, for in our latitude the sun to-day at noon was 52' below the horizon. If we were superstitious we might attach some significance to this strange occurrence.

November 10th, Wednesday. — The extraordinary re-

fraction continued to-day, and even greater in amount. The sun was well above the horizon at noon, and some portion of his disc showed from eleven to one, at which last named hour he sunk out of sight. For how long?

Mr. Dunbar and Alexey on going out to the bear-trap to-day saw fresh tracks near it, and setting Alexey's dogs on the scent a chase was inaugurated. The dogs came up with Bruin several times and got him at bay, but as the traveling was "fearful bad" the hunters could make no headway, and the dogs were forced to give in at last. When Dunbar and Alexey finally came up with the dogs the poor brutes lay extended on their sides exhausted, but the bear had gone on.

November 11th, Thursday. — The general monotony was somewhat varied to-day by Aneguin sighting a bear from the deck-house, and though he started with some dogs in chase failed to come up with it. Even the failure was a change to the monotony.

Bright, cloudless Arctic night in all its beauty of moonlight and starlight. A magnificent lunar halo at six P. M., something grand beyond description. Surrounding the moon were sharply defined circles of deep prismatic colors, making one think of a large colored glass dial strongly illuminated. The whole, 5° in diameter. Sounds of grinding ice to southward at three A. M.

November 12th, Friday. — Another day easily recorded by a few lines and the greater part of those lines devoted to mentioning the demise of another dog, a victim to a cross-lodged mutton bone. The thirty-four survivors of the canine family do not seem overcome by grief, — the advent of the steward with dish-water and dinner bones admonishes them of the greater importance of the reality of life.

The native instinct among Esquimaux is to let sick or wounded dogs take their own chances of recovery, although no lack of regard and good feeling is apparent. If a bear tears a dog, or if in a fight a long cut is inflicted, the victim licks his sore until healed. Sewing up a wound is not adopted. Anything besides a wound is diagnosed by Alexey thus, "Something wrong inside; bymby, perhaps, die." And though we have physicked and operated on dogs, "bymby" they do die.

November 14th, Sunday. — At 1.30 A. M. I was startled by a severe shock to the ship, taking her as if she were sliding down an inclined plane and suddenly brought up, or as if she had been struck a severe blow under her stern. I ran for the man on watch, but he had noticed nothing he said, and there were no signs of disturbance in the ice. I learned afterwards that the shock had awakened everybody aft, but that no one forward had felt or noticed anything; it may be well to add that so callous have we become to such things as shocks that nobody turned out. At six P. M., while the ice was grinding in an ugly way in the lead one eighth mile astern, I was on the deck-house with the zenith telescope, looking out for occultations of Jupiter's satellites. Mr. Dunbar came up and quite earnestly asked me if I heard the pressure going on; but as I was watching Jupiter intently I made some such indifferent answer as, "Heard it some time ago," etc., quite to his astonishment. No doubt he thought that I was taking things easy, but the fact is I have long since concluded to borrow no trouble. We cannot prevent any disaster that may befall us, and we have made all possible provision for its coming. Human strength is of no avail and human wisdom of no value.

In our position we have done all that man can do, and we must leave the rest with God. After breakfast, as soon as people began to move around, it was discovered that the lead a mile ahead of the ship, as well as the lead one eighth mile astern, were both open, the latter to a width of one hundred yards. Hunters were out at once and Nindemann got a seal, in which was found an embryo, as beautiful an addition to our collection of natural history as we have yet received. Except as to its flippers it looked like a puppy in many respects.

Inspected the ship at eleven, and had divine service at 1.30. The berth deck, for dryness and general comfort, was as perfect as perfection itself. If we keep it all winter as it is now, we may consider that we have solved a difficult (heretofore) Arctic problem.

November 15th, Monday. — A day magnificently bright and clear. For the greater part of the day the sky was absolutely cloudless, and a bright moon and starlight made up a superb Arctic picture. Light S. W. breezes and a most remarkable rise of the barometer from 30.15 to 30.95. It will be well worthy to note carefully the result of this occurrence, particularly as it comes about the time of full moon. If a full moon for tides, a high barometer for wind, do not make some remarkable change in the ice I shall be much surprised.

November 16th, Tuesday. — The barometer goes up, up, until at nine A. M. it reaches its maximum 31.08; at nearly the same time the moon became full, so these two occurrences coincided. Light southerly breeze of six miles had diminished to two miles by noon, and as the barometer then began to fall I was on the lookout for some unusual result. The wind began to back and

freshen, going from S. S. W. to E., freshening gradually, and the barometer dropped to 30.89 (one tenth of an inch in the last three hours); the temperature went up in the most charming manner to minus 10.5°.

Sounds of grinding ice were heard from ahead and astern at three P. M., but nothing remarkable occurred, and we must wait to see what to-morrow will bring forth.

November 17th, Wednesday. — The result of the wonderful barometric action has shown itself to-day in a lively gale of wind which blew the light snow surface around in clouds of blinding dust, and banked them up here and there in hard masses strong enough to bear a man's weight. The wind varied between E. and E. S. E. all day. The barometer dropped rapidly from 30.77 to 30.10, and the temperature rose steadily to plus 8.5°, giving us by comparison a temperate zone existence.

November 18th, Thursday. — The gale came quickly, lasted but a short time, and is gone. Dull and gloomy weather; heavy water-sky to northward.

November 21st, Sunday. — Usual Sunday routine of inspection and church.

November 22d, Monday. — I said nothing yesterday about the dryness of the berth deck and ward-room, for those places are now steadily dry. The galley-house, from its exposed situation, has given some discomfort, but I hope that is now overcome. Deprived of its shelter of last winter, the deck-house, its forward end is not sufficiently protected by the felt which we have padded it with. As a consequence, condensation takes place on this forward end during the night (the galley fires are out at four o'clock), freezing and giving no trouble. But when the galley fire is lighted in the morning, this

ice melts, and used to make the two beds wet. By building a little canvas pocket or back to each berth, the ice can be scraped out readily each morning before it melts, and the enemy is accordingly thus circumvented.

In my room and in Chipp's room condensation takes place regularly on the forward bulkhead, and generally remains as ice. But sometimes, when the temperature of the cabin runs up to 60° by inadvertence, our rooms get warm enough to melt the ice, and a little pool or meandering stream results. This, of course, is at once dried, and the evil is checked. But when the berths are against the inner bulkheads, everything is as dry as a bone. Low temperature as a rule, except at nine and six P. M., when some ice opening made heat escape from water exposed, and the temperature jumped up.

November 23d, Tuesday. — Another day of the usual stagnation. Alexey's dogs got on the trail of three bears, overtook them, and brought them to bay for the time; but the bears escaped by swimming across a lane of water before Dunbar and Alexey could come up.

November 24th, Wednesday. — Light, variable airs. A day more devoid of interest it will be difficult to find.

November 28th, Sunday. — One more week is come and gone, and our life of monotony continues. The sameness of our existence has become painful, and life seems a burden. The mere fact of doing something would be a relief, but even that is denied us. We have done nothing, are doing nothing, and, so far as we can see, shall do nothing that can be of any use. To eat food and wear out clothes, without any result for the money expended, is poor comfort. I am satisfied that we are affected by the length of time since we have had foot on shore. Like the old saying, "Dogs need

grass occasionally," may be quoted as a proverb, "Man needs land once in a while." Excepting the small party that landed at Koliutchin Bay, none of us have set foot on the land for nearly fifteen months, and our sensations now are somewhat dull when we try to realize what it was like. According to my idea, we have become receivers of magnetism without proper earths to let it escape. Our rest is broken and unnatural. It is not an unusual thing for those of us who turn in at ten P. M. to lie awake until three A. M.; and I, who cannot turn in until after midnight, never turn in before one o'clock, and rarely get asleep until nearly 3.30. We are all awake at various times afterwards, and no one sleeps after nine A. M. Each morning we are dull and heavy, having no feeling of rest obtained, and a kind of lethargy clings to us until we get out for our daily walking exercise from eleven to one. From that time forward we are in our normal condition, having no especial desire for sleep, and yet feeling somewhat out of sorts for want of it.

November 30th, Tuesday. — Soundings in twenty-five fathoms. Very rapid drift to N. N. W. At three P. M., by a Sumner of stars, the ship is placed in latitude 74° N., longitude $178^{\circ} 15'$ E., showing a remarkable drift in two days of twenty-two miles to N. 32° W. Hardly believing that we could have gone so far, I got the meridian altitude of Jupiter at eight P. M., which gave a latitude of $73^{\circ} 50'$, differing $10'$. But as the meridian altitude was only 18° , and the refraction accordingly much in doubt, I decided to consider the Sumner nearer correct.

December 2d, Thursday. — The usual monotony was very pleasantly broken to-day by the killing of a bear. At ten A. M. Chipp sighted him, and got within eighty

yards of him, but it was so dark as to prevent seeing the sights on the rifle. Like my adventure of August 22d, the bear showed no fear of Chipp, but advanced toward him until the rushing of men and dogs startled him, and he then turned and ran. Dunbar soon overtook and passed Chipp, and Alexey and Aneguin passed both, while the dogs took the lead and brought Bruin to bay. Alexey got the first bullet in the prize, so the skin goes to his employer, Mr. Bennett; Dunbar got the second shot, and Aneguin the third. The fourth and fifth shots were delivered by Dunbar and Alexey, and the prize was ours at about 1,000 yards on our port quarter. He was a fine capture. Length over all, eight feet three and one half inches; weight, eight hundred pounds; a welcome addition to our provisions and dog food. The traps were both found tripped but empty, showing that they had been visited. Preparations are being made for rigging one of our whale-guns at the trap to deliver a charge of buckshot, which ought to astonish if not kill any bear who trips the line attached to the trigger. A lively day for wind. The surgeon's report of examination is satisfactory. An improvement is noticed in our condition this month over last month.

December 5th, Sunday.—At ten A. M. a crack was found in the ice three hundred yards east. This is the line of the same break that occurred some time ago. At eleven P. M. the crack closed, grinding and groaning going on at a great rate. After nine P. M. the cold made our fastenings snap and crack. Observations show our drift since November 30th, E. fifteen and one fourth miles. The auroral display was exceedingly fine to-night.

December 7th, Tuesday.—A bright, pleasant day until noon, when it began to cloud up, becoming en-

tirely overcast by three P. M., and so continuing with occasional clear spots.

December 11th, Saturday. — Our position is determined to be in latitude N. $73^{\circ} 44'$, longitude W. $178^{\circ} 56'$, showing a drift since the 6th of thirty-three miles to S. 74° E. This is remarkable for its amount, and would be satisfactory in its direction if it would only continue to the Atlantic Ocean. The day is otherwise worthy of note for its clearness and brightness, and its intense cold, minus 39° , which, later, led me to cut the usual two hours' exercise down to one hour.

Frequently during the day we were startled by loud reports like the discharges of heavy guns, and the ship was considerably jarred by them. I can only account for these noises by supposing that the heavy ice splits under contraction caused by the intense cold.

December 12th, Sunday. — The arrival of another Sunday brings the usual inspection, which is satisfactory, as showing dry quarters and other internal comforts. Divine service followed at 1.30.

December 15th, Wednesday. — A very severe day, N. N. W. winds, backing after three P. M., and reaching W. N. W. by midnight. The temperature begins at minus 40° , and steadily falls until it reaches minus 43° ; the lowest point of our mercurial thermometer 4,313, spirit thermometer 4,397, then reading minus 40° . The purple bulb spirit thermometer, which agreed very well with our mercurial last winter, was now exposed, and it went down until at midnight it read minus 48° . The sky has been absolutely cloudless all day.

December 16th, Thursday. — I have been waiting for a long time in anticipation of making general observations on our surroundings, weather, etc., at the time of the total eclipse of the moon, which occurred this

morning; but I suppose I thought about it so much, or thought about so many other things, that I lost it in the confusion of my mind. For the first intimation I had of having overlooked the time was a note in the slate this morning of its approaching expiration at three A. M. All that I can remark about this eclipse, with reference to our experience, is, that it was preceded and followed by extreme cold; that for twenty-four hours previous we had an absolutely cloudless sky; during the eclipse a thick haze prevailed, and afterwards cloud-forms, cirrus, cirrus-stratus, and stratus, were in view. During the day we had numerous shakes and jars, as though we were passing over ice-cakes. One of these was sufficient to set my lamp swinging.

At three A. M., while lying awake, I heard two singing or humming sounds along our wires in the cabin, resembling the buzz of a bee, or the whiz of a mosquito. These came from the vibrating of the diaphragms in the Bell telephone receiver and sender, indicating an electric storm without, etc. This subject is now receiving particular attention from Chipp, and will be described thoroughly in a more suitable place than this journal.

December 19th, Sunday. — Inspection at eleven, church at 1.30, and this is the record of one more day in the Arctic regions.

December 21st, Tuesday. — This day is noticeable chiefly as having decreased by one the number of our dogs. He was known in life as "Hard-Working Jack." The usual post-mortem was performed by Aneguin, and it was found that the premature demise was due to several mutton-bones, two pieces of a tin can (cutting entrails, as might be expected), a piece of cloth, and the fag end of a rope.

December 22d, Wednesday. — Though the sun yesterday reached his greatest southern declination, and commenced his return, I do not notice any difference in the amount of light. We have had dull, gloomy weather, dark as a pocket, and very depressing.

December 24th, Friday. — Curious weather. Fluctuating barometer, extremes 29.85 to 30.03. Very hazy, lowering, dull weather, and a nearly steady fall of fine snow.

In the evening we had a minstrel entertainment in the deck-house, somewhat improved over last year.

GRAND OPENING

OF THE

NEW JEANNETTE OPERA HOUSE,
CORNER FORECASTLE AVE. AND BOWERY,

Friday Evening, Dec. 24, 1880.

Doors open at seven o'clock. Performance at eight.

COMPLIMENTARY.

The success of the evening, however, was Sharvell as a young lady, in an after-piece. Görtz, as costumer, had made out of our calico a fine dress, with paniers, etc., complete, and found means to construct a beautiful wig of long blonde hair. With these, white stockings and low shoes with blue rosettes, Sharvell transformed himself into a very comely young English miss, quite calm and self-possessed. A feature of the evening was presenting each guest, on entering, with a little button-hole bouquet of colored paper leaves.

The jokes were of the usual order, some broad ones being inevitable. The conundrums were rather feeble: "Should Melville give an alarm of fire, what place would it remind you of?" "Melville Sound." "Why was Chipp like McClellan?" "Because he was liked by his men." "Why was Danenhower like his native

city, Washington?" "Because he was at the head of navigation." "Why was I like the mainmast?" "Because I was de long-un." "Why did the crew of this ship resemble the Captain?" "Because he is Commander, and they come-under, too," etc., etc.

Probably, however, the most acceptable occurrence was the issue of a double ration of whiskey, with which, hot water, and sugar, we tried to be cheerful, and make Christmas Eve rather less dreary than many of our days now seem.

Christmas, December 25th, Saturday. — The day was made as acceptable as possible fore and aft, by the providing of a good dinner from our resources. And I think we may refer to our bills of fare with pardonable pride. Our mince pies were a work of art; though they were made from pemmican and flavored by a bottle of brandy, they were as delicate to the taste as if compounded from beef fresh from market. Hot whiskey punch in the evening fore and aft brought an agreeable close to our second Christmas in the pack.

CHRISTMAS DINNER, 1880.

CABIN.

The usual Saturday Soup.
 Roast Seal, Apple Jelly.
 Tongue.
 Macaroni.
 Tomatoes.
 Mince Pies.
 Plum Pudding.
 Figs.
 Raisins.
 Dates.
 Nuts.
 Candy.
 Chocolate and Coffee.

BERTH DECK.

Soup.
 Roast Seal, Apple Jelly.
 Bacon (broiled).
 Macaroni.
 Tomatoes.
 Mince Pies.
 Figs.
 Raisins.
 Dates.
 Nuts.
 Candy.
 Chocolate or Coffee.

There is some atmospheric disturbance at work to the southward of us, which may reach us later, for in no other way can our high temperature, plus 11.5° , and rapid drift be accounted for.

December 27th, Monday. — A very remarkable auroral display at three A. M. is thus described by Chipp: "A bright auroral curtain about 10° above horizon, from east southeast to northwest, generally white, but occasionally showing a green shade, and rarely a brownish red color, which disappeared as soon as seen. Above this curtain the sky was of a deep blue-black color, through which the stars shone brilliantly, as they did also through the deepest part of the curtain. Above the deep blue-black color there were irregular spirals and streaks of white light, which were in continuous motion, appearing and disappearing rapidly. From east to west, through zenith, was an irregular arch formed of detached streaks of brownish red light, among which white light would suddenly appear, and as suddenly vanish. This arch was 5° broad. Stars shone with apparently undiminished brilliancy through the deepest color.

"Between this arch and the bank of stratus clouds above the southern horizon the sky was covered with irregular patches and streaks of light, which seemed to drift away to windward. At 3.30 all had broken up and drifted to southwest, and there succeeded white flashes all over the sky."

December 28th, Tuesday. — Weather clear, bright, and pleasant, but extremely cold. Minus 32° .

December 31st, 1880, Friday. — The last day of the year and I hope all our trials and troubles have gone with it.

The men had a celebration from eight to ten P. M. in the deck-house, very good minstrels and single acts making an acceptable programme.

THE CELEBRATED JEANNETTE MINSTRELS.

PROGRAMME.

PART I.

Overture	Orchestra.
Ella Ree	A. Sweetman.
Shoo Fly	H. Wilson.
Kitty Wells	Edward Starr.
Mignonette	H. Warren.
Finale	Company.

Intermission.

PART II.

The World-Renowned Aneguin, of the Great Northwest, in his original Comicalities.

The Great Dressler, in his favorite Accordeon Solos.

Mr. John Cole, our favorite Clog and Jig-Dancer.

Wilson, as the great Captain Schmidt of the Dutch Hussars.

Violin Solo. By George Kuehne (Ole Bull's great rival).

Intermission.

PART III.

Concludes the performance with the side-splitting farce of

“MONEY MAKES THE MARE GO.”

Mr. Keene Sage	George Boyd.
Miss Keene Sage	Miss Sharvell.
Charles Tilden, a promising young man in love with Miss Sage	H. Leach.
Julius Goodasgold	H. Warren.
Costumer, A. Görtz. Property Man, Wm. Nindemann.	

JEANNETTE MINSTREL TROUPE.

PROGRAMME.

PART I.

Overture	Company.
The Slave	Mr. Sweetman.
Nellie Grey	Wilson.
What should make you Sad	Boyd.
The Spanish Cavalier	Starr.
Our Boys	Warren.

PART II.

The Great "Ah Sam" and "Tong Sing," in their Wonderful Tragic Performances.

Accordeon Solo, by the Celebrated Artist "Herr Dressler."

Mr. Henry Wilson, in his Serio-Comic Songs.

Alexey and Aneguin still on the Role.

Violin Solo	G. Kuehne.
Ellagic Views	Mr. Sweetman.

PART III.

To conclude with the popular play

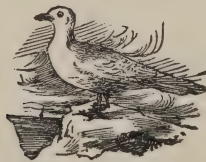
"THE SIAMESE TWINS."

Professor	G. W. Boyd.
Agent, in love with Professor's Daughter	H. W. Leach.
Professor's Daughter	Miss Chicken.
The Twins	{ P. E. Johnson. H. D. Warren.

Friday, December 31st, 1880, "Star Spangled Banner" Company.

Everybody was bright and cheerful, and the performance closed by all hands singing the "Star Spangled Banner." For the sake of saying something cheering to the men, I then made a few remarks to the effect

that we were about to turn our backs on the old year and our faces to the new ; that this cruise, like every event in life, might be divided into two parts, that which has been and that which is to be. During the past sixteen months we had drifted 1,300 miles, far enough, if in a straight line, to reach the Pole and beyond it ; but we were only actually 220 miles northwest of where we were first beset ; we had suffered mishap, and danger had confronted us often ; we had been squeezed and jammed, tossed and tumbled about, nipped and pressed, until the ship's sides would have burst if they had not been as strong as the hearts they held within them ; we had pumped a leaking ship for a year and kept her habitable ; we were not yet daunted, but were as ready to dare as ever. We were all here, in good health, etc. We faced the future with a firm hope of doing something worthy of ourselves, worthy of the enterprise of the gentleman whose name was so closely connected with the expedition, worthy of the flag which floats above us, as by the blessing of God we would, and then we could go back to our homes, and with pardonable pride exclaim in the future, "I, too, was a member of the American Arctic Expedition of 1879."



The Kittiwake.

CHAPTER XI.

THE LAST OF THE JEANNETTE.

January — 9 June, 1881.

The Old Year out and the New Year in. — The Solid Snow. — Imprisonment. — Exercise. — Sudden Changes. — Reappearance of the Sun. — Increase of Daylight. — Dog Misfortunes. — Deep Soundings. — Anequin's House. — Washington's Birthday. — Alexey's Sickness. — Bear Fight. — The Sick-List. — Sick Dogs. — Danenhower's Case. — The Chinamen stray off with the Dogs. — Search for the Lost Dogs. — The Wildness of Ice. — The Dogs on Short Rations. — Land! — Speculations about the Island. — Mr. Chipp on the Sick-List. — Lauterbach's Misfortune. — A Party sent to visit the Island. — Their Outfit. — Orders. — Lead Poison. — Return of the Party. — Report of Discoveries. — Henrietta Island. — Jeannette Island. — Anticipation of Trouble. — Sudden Disaster.

JANUARY 1st, 1881, *Saturday*. — I begin the new year in this book by turning over a new leaf, and I hope to God we are turning over a new leaf in our book of luck. The record on January 1st, 1882, "No greater advance toward the Pole, or toward the accomplishment of some other object worthy of consideration," would be humiliating indeed. I am, of course, thankful and grateful for our preservation in many perils, for our continued good health, and for our undiminished zeal and enthusiasm as manifested last night, when the men made the deck-house ring with their cheers at the end of my remarks, but I want to get on to achieve something to save us from disappointment and mortification.

Melville and Dunbar sat up with me to see the old

year out and the new year in. At midnight, when the men had finished a verse and chorus from "Marching through Georgia," eight bells were struck for the old year, three cheers were given for the ship, eight bells more were struck for the new year, and 1881 was thus officially inaugurated in the United States Arctic Steamer Jeannette, in latitude $73^{\circ} 48' N.$, and longitude $177^{\circ} 32' E.$

January 3d, Monday. — A gale all day from east. The ship is buried up to her rail by the snow-drift, and wherever the deck was exposed large masses were piled there also. A low bank in the southwest horizon, which has remained there for two days, looked suspiciously like land.

Usual medical examination to-day and the doctor reports favorably, our general condition being even improved, though we never had anything to complain of.

January 4th, Tuesday. — The day began with a continuance of the gale, but it moderated rapidly after noon. The sky being cloudless we had excellent chances for determining our position; by meridian altitude, Jupiter, and time sights of Vega, we find we are in latitude $74^{\circ} 8'$, longitude $175^{\circ} 32' E.$, showing a drift of no less than thirty-eight and one half miles to N. $58^{\circ} W.$ since December 31st. This is startling, for it shows more of a chance of getting along somewhere yet. We are very little south of our position of June 3d ($74^{\circ} 18'$), which we attained after a steady drift during March, April, and May; and if we can only hold our own near this until the effect of the Siberian rivers can be again felt, we may get a push that will get us into open water, or at least navigable water. Soundings in thirty-two fathoms, rapid drift to W. N. W. being indicated by the lead line. The planet Venus showed at three P. M.

on the south meridian, about 2° above the horizon. It was a beautiful sight indeed. The refraction being considerable, she showed with remarkable size and dazzling brilliancy, while seeming to dance about with unrestrained joy. I take it for a happy omen.

The old crack, two hundred and fifty yards east of the ship, opened again to the width of one foot. Tracks of a bear were found nearly alongside this morning.

January 5th, Wednesday.—At three A. M. one would have believed we were in for a lively time. At 2.50 the ice seemed in general excitement, snapping and grinding, while the ship experienced several severe nips. The quartermaster was running into the cabin to report, but was met by Chipp on his way to make weather observations, so I was not aware of it. The quartermaster's impression was that everything was about to turn upside down. Chipp says the ice was cracking and grinding under his feet right alongside. In ten minutes all was quiet again, and when daylight came the only sign of any change was the closing together of the lead opened yesterday.

I anticipate from the falling barometer and increasing cold a S. W. wind before long. Anything that will favor us is much to be desired. I can see nothing to be gained by ranging along parallel to the Siberian coast, and something may be gained by working to the eastward. If patience and long-suffering, hope deferred and deferred again, anxiety and ambition, could give me foresight, how glad I should be, — perhaps, for after all the yet unknown future may be worse than the known present.

January 7th, Friday.— It would be very difficult for any one accustomed to the winters of the temperate zone to understand how hard the snow may be packed

by the action of the wind up here. The gale which we had some days ago, and which sent us spinning away to the northwest, played some curious freaks. It not only buried the ship to her rails, but it laid out the surface snow into long ridges sastrugi, which give our surrounding floe the appearance of a newly-plowed field. These ridges piled up in straight lines running to leeward and as hard as ice, and making walking difficult, lead me to many a tumble as I poke about with a lantern, reading thermometers, etc.

Our weary days drag along without novelty or change. Living mechanically as we do, no change or novelty seems possible. The wind having ceased to blow, we are zigzagging again, evidently; for our lead line showing us to-day thirty and one half fathoms, indicates also a slight drift to S. S. W. And so we go; the temporary hope that at last we are drifting somewhere was soon dissipated. So far as I know, never has an Arctic expedition been so unprofitable as this. People beset in the pack before have always drifted somewhere to some land, but we are drifting about like a modern Flying Dutchman, never getting anywhere, but always restless and on the move.

Coals are burning up, food is being consumed, the pumps are still going, and thirty-three people are wearing out their hearts and souls like men doomed to imprisonment for life. If this next summer comes and goes like the last without any result, what reasonable mind can be patient in contemplation of the future?

January 10th, Monday.— Another easterly blow, which causes the snow to fly in clouds again along the surface of the floe. Barometer falls rapidly from 30.46 to 30.09, and the temperature as quickly runs up to plus 6.5°, causing one to feel quite languid with the

heat. This sounds queer, but it is quite correct. So generally are we accustomed to cold, and warmly clad in consequence, that a change like to-day gives one a lazy, drowsy feeling not easily overcome. A range of 32° is considerable, and would occasion remark at any time at home.

January 19th, Wednesday. — One year ago to-day we had our serious trouble with the ice and received our injuries. Since that time the water has steadily come into the ship, and has been as steadily pumped out. Chipp kept a record of the number of pump-strokes to-day, and determines our leak to be 2,692 gallons for these twenty-four hours, or $112\frac{1}{2}$ gallons per hour. Weather generally dull and gloomy until three P. M.; bright and pleasant thereafter. To-day at noon I could read the instruments on the floe without a lantern for the first time this year. At ten P. M. a brilliant aurora.

January 20th, Thursday. — A very cold day, but, owing to the absence of wind, not an uncomfortable one. I have made it a rule to suspend the enforced exercise from eleven to one whenever the temperature is below minus 30° , and in extreme cases of gales of wind have extended the suspension with warmer temperature. Though not enforced, the taking of exercise seems to be adhered to for an hour at least, under even these unfavorable circumstances. The thing is left to individual option. To-day, while the thermometer stood at minus 44.5° , officers and men were walking around on the floe as unconcerned as if we had had a spring day common to the latitude of New York. It is a matter of congratulation thus far that we have not had a single case of serious frost-bite.

January 21st, Friday. — Another very cold day, and

being favored with very light southerly airs we are able to go about without much discomfort. One's feet seem to be the most vulnerable, particularly if standing still for any time. In spite of fur stockings and seal moc-casins, the heat is drawn out rapidly and wasted on the ice beneath. As is usual with cold weather, we have considerable auroral display. But as these displays are carefully recorded in the meteorological log, I do not care to repeat them here.

January 22d, Saturday. — Position: latitude $74^{\circ} 8'$ N., longitude $173^{\circ} 26'$ W.

January 23d, Sunday. — A bright, pleasant day, but intensely cold (minus 47°). Light southerly and S. W. airs make outside walking tolerable, and for a short time even very pleasant, but the heat seems to gush out from one's nose and feet and bring one back to the realization that it is a winter's day. Towards bedtime Mr. Dunbar, on entering the cabin, announces in a grave tone that he "thinks there will be frost to-night," and after some consideration we all agree with him. Possibly people in New York are feeling cold at plus 32° (only 79° warmer than we are having it), — a temperature which used to remind us of the tropics last summer, and led to a search for straw hats. However, as philosophy considers no such thing as cold, but characterizes that phenomenon as a less degree of heat, we may merely consider our climate as not so warm as that of New York. I never think of phenomenon without being reminded of Melville's story of the Scotchman, who defined a phenomenon to his son Jamie as follows: "Gin you see a coo, Jamie, that's no a phenomenon; and gin you see a tree, that's no a phenomenon; but gin you see a coo climbing a tree backwards, that's a phenomenon, Jamie, that's a phenomenon."

An extraordinary feature is the marvelous height to which the barometer has risen. Beginning to-day at 30.55 it reaches 31.7 by midnight, and is not finished yet in its ascent. Something unusual may be anticipated with respect to the weather as a sequence to this state of things.

A bright red glow showed on the southern horizon at noon, and a warm red glow in southwest at three p. m., — welcome signs of the approaching return of our long absent sun. Already I have considerable daylight in my room at noon, — not enough to read by, to be sure, but still enough to enable me to do without my perpetual candle, and to look at the ghastly shapes of my furniture with a sense of pleasant relief to my eyes as I peer around me from my easy chair. Inspection and divine service followed our usual morning occupations. It would be endless repetition to say we have a perfectly dry berth deck and not a sign of drip.

January 26th, Wednesday. — One thing may be said of this winter which we could not say of the last, that if we have had plenty of cold weather we have also had some remarkable changes to higher temperatures. Two days ago we had minus 50° to contemplate, and now we are sweltering at 0 and above it. What these sudden changes may portend I cannot say, and what physical circumstances they may indicate I am in no position yet to affirm. But to my perhaps too sanguine imagination, it seems that if we have reached such a changeable part of the world we may reasonably hope for a different experience next summer than we had during its predecessor, and perhaps get adrift from these remorseless prison walls of ice that have held us so firmly for seventeen months.

The easterly gale begins with a velocity of twenty-

nine miles an hour, but rapidly moderates, and by midnight we have a stark calm.

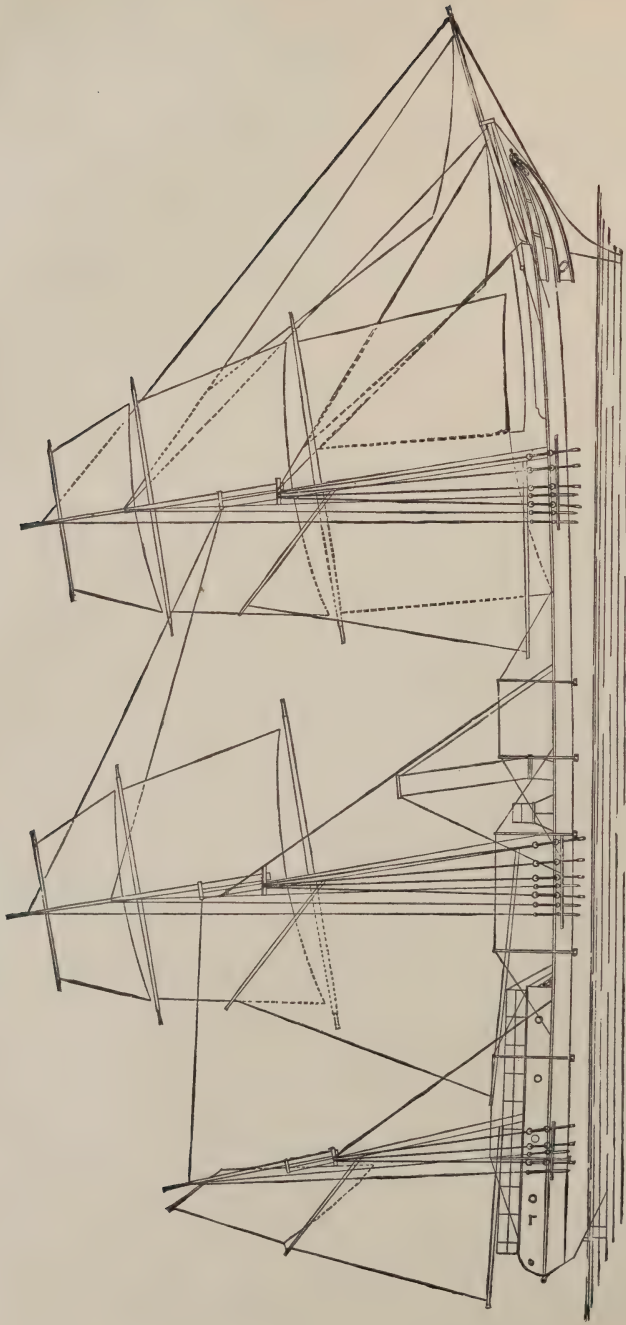
January 27th, Thursday. — Light southerly airs, position obtained showing a drift of thirteen and one fourth miles N. 20° W. since 22d. Latitude 74° 20' 56" N., longitude 173° 10' E., — the highest latitude we have obtained in the nineteen months' cruising! Slow music!

January 31st, Monday. — Ice found by actual measurement to be five feet four inches thick by direct freezing since August 31st, and a gain of ten inches in the past month. As all our measurements are made by boring in a protected place, no increase of thickness is due to snow-drift freezing on the surface. We get the actual growth, and naturally all increase is on the under side.

It is worthy of note, that the upper half is much the harder. It is with great difficulty that the auger is got down, the ice offering as great resistance as plate-glass or rock, and the pieces broken out by the auger threads being as firm as flint. Through the lower half the boring is much easier, the ice seeming to be softer and more yielding.

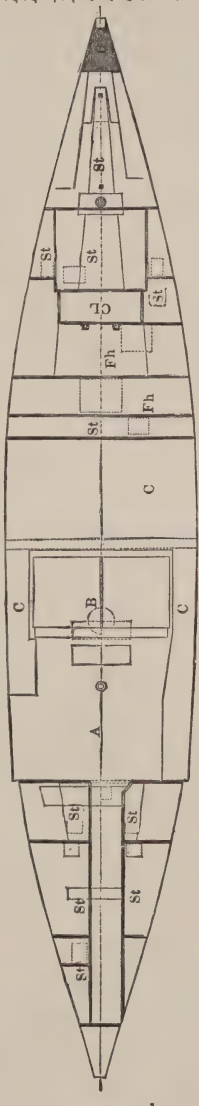
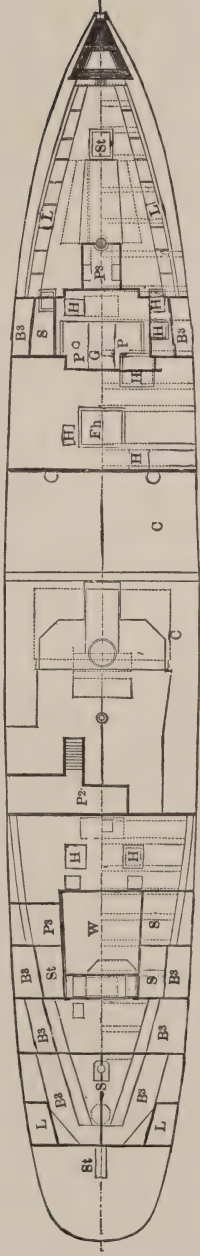
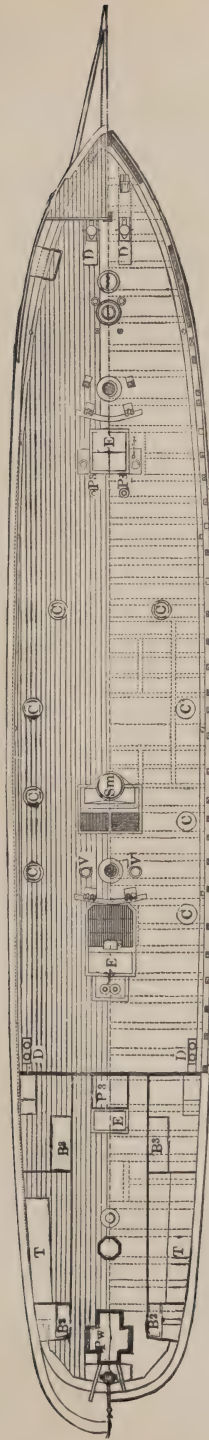
February 1st, Tuesday. — The first of the month brings the surgeon's examination if it brings nothing else. Dr. Ambler concluded the examination, and handed in his report. The condition of thirty-one of us is pronounced good, the remaining two (Danenhower and the cook) being in fair condition. The cook has nothing the matter with him, but is simply thin.

Taking advantage of a break in the generally prevailing cloudiness, Chipp gets a set of sights to-day by which our position is determined to be in 74° 39' N., and 172° 25' E., a drift since the 27th January of thirty-two



SAIL PLAN OF THE ARCTIC STEAMER JEANNETTE.

See Appendix F for notes upon the construction of Arctic steamers.



L, Lockers.
*P*¹, Pump.
*P*², Photographing-room.
*P*³, Pantries.
Pw, Propeller well.
S, State-rooms.
S, Stores and Store-rooms.
Sm, Smoke-stack.
T, Tables with lockers.
V, Ventilators.
W, Ward-room.

A, Engine-room.
B, Boilers.
*B*², Baths.
*B*³, Berths.
C, Coal.
*C*¹, Chain locker.
D, Bites.
E, Companion ways.
Fh, Fore hold.
G, Galley.
H, Hatches

SPAR DECK, BERTH DECK, AND HOLD PLANS OF THE ARCTIC STEAMER JEANNETTE.

miles N. 33° W. This is our highest latitude thus far, but not the highest I hope for the cruise.

The gales and strong winds hold on with curious persistency. To-day it blows from southeast from twelve to nineteen miles an hour, while, strange to say, the barometer goes up steadily from 30.39 to 30.68, and the temperature as regularly falls to minus 13.5° . Under ordinary circumstances this would indicate a northerly wind, but there is no disposition to change.

My wind record for January is curious. Of the 7,644.8 miles of wind, 5,137.1 are from between east and south by east, and of these 2,892.2 are from east alone. Our experience since September, 1879, fails to show as windy a month. Our drift for the month ending to-day is ninety-nine miles N. 59° W., as against sixteen and a half miles S. E. for the same month last year. There is so much encouragement in these figures that I record them here. A bright red glow on the horizon at noon showed us where the sun had got in his effort to reach us on the 3d.

February 2d, Wednesday. — Still drifting rapidly, this time due north, and a marked increase in our soundings thirty-six fathoms. The old lead astern is opened to-day, and before ice can form Alexey and Aneguin go out to it and fortunately get a seal.

February 5th, Saturday. — Observations to-day place us in latitude $74^{\circ} 49'$, longitude $171^{\circ} 49'$ E., a still further drift of thirteen miles to N. W. I confess I am considerably disappointed, for, flattered by the increase of soundings, and the rapidity of drift indicated by the lead line, I was in strong hopes of finding our latitude to be 75° . We no doubt have been further north than $74^{\circ} 49'$, and are set back somewhat by the N. W. wind of yesterday evening, though our lead line to-day, in

showing forty fathoms, indicates no drift, and our lost ground cannot amount to much.

However, "Every cloud has a silvery lining," for, to console us, we had the sun on our horizon to-day at noon. The last time we saw it was on November 10th, 1880 (being then, as on the 9th, raised above the horizon at noon by extraordinary refraction), and our night has therefore been of eighty-seven days. It is worthy of mention, however, that the sun disappeared on the 6th of November, did not come above the horizon on the 7th and 8th, and that our night might fairly be called ninety-one days, as against seventy-one of last year. Well, we are all here, thank God, and as hopeful and reliant as ever. We all look more or less bleached out, and the doctor says we all look care-worn to some extent. But I do not think any men could lead the life we have led for seventeen months, of peril, uncertainty, disappointment, and monotony, without showing traces of its effects.

To-day we commenced with N. W. wind, but it backs, and grows light in so doing, until at midnight it is from east, and the temperature falls to a disagreeably low figure; though between nine P. M. and midnight it jumps up from minus 36.5° to minus 26.5° . I may say, however, with perfect correctness that the cold seems to affect us less this year than it did last, and though our night has been longer now than then, it has passed away with seemingly greater speed. I cannot explain the first fact, because it is contrary to general experience; the second, however, is easily accounted for by our exemption from pressures and ice movements. Last year we were never easy — jam, smash, jam, smash — until finally we had our stem sprung, and a leaking ship to care for and preserve. This year we have not

been disturbed at all. The doctor puts it very well when he says, "Last winter I went to bed expecting to be turned out, and was surprised that I was not; but this winter I go to bed expecting not to be turned out, and would be very much surprised if I were."

Our dogs have pulled through all right, but one having yielded to the superior force of sharp bones in his intestines. Though they are all lean and thin, I hope soon to get fattening food for them in the shape of bear meat. Bruin ought to leave his hibernation, and wander around by sunlight in quest of food, and follow the wind until he gets in our neighborhood. This winter we have fed our dogs on seal-blubber mixed with condemned oatmeal, which mitigates the effects which blubber alone might produce from its oily properties. The mixture steamed seems nutritious, and at all events has accomplished our purpose.

February 7th, Monday. — The days seem to increase in length like magic, — that is, the amount of daylight seems to spring to large proportions, considering that it is only two days since our sun came above the horizon. This morning at six o'clock low, bright dawn showed in the southeast; at 10.22 A. M. the sun commenced to shove his upper limb to view from deck; and at 1.10 P. M. he passed again from view. At three o'clock there was enough light in my room to answer ordinary toilet demands, though not enough for reading; but on the floe everything was bright and lively. Venus and the moon showed plainly, Jupiter and Saturn were barely visible in the broad daylight, and stars of the first magnitude not at all.

Accompanying the bright weather we had cold *ad nauseam*. As is usual when the temperature is decent, say between zero and minus 25°, the sky is generally

overcast, and the sensation produced is that of dullness; and when the weather is bright enough to be enjoyable the temperature is low enough to freeze the enjoyment. It is on these occasions that we confidently predict "frost to-night."

February 10th, Thursday. — I believe, upon mature reflection, the only thing of importance in to-day's existence is our learning of one of our dogs having had a tape-worm, and our proceedings to keep the article from being generated in other creatures, human or canine. About a week ago our little Russian dog Dan got rid of about eight feet of tape-worm, which it appears was carefully secured and bottled by Mr. Newcomb. Dan is now tied up, will receive no food for twenty-four hours, and then will be treated to a dose by the doctor, to insure a further installment or an exhaustion of the supply.

February 12th, Saturday. — Such curious weather as ours has been to-day deserves recording. We are evidently preparing for another blow such as we had on June 24th, 25th, and 26th, the barometer acting in a similar way. The temperature, however, acts differently. Then the coming wind was preceded by minus 44° to minus 49°, but it had pushed it up to plus 2° by the time it ended. Now the temperature runs up to plus 15.5° in anticipation. If the proportional increase remains the same, we ought to have ice melting around us before the coming gale ends. A year ago we had on February 12th between minus 31° and minus 39°, and an average for the day of minus 35.6°. Verily, verily, no two winters in the Arctic are alike.

February 14th, Monday. — It begins to look as if we were not going to have a gale after all. Position 75° 4' N., longitude 171° 3' E.; drift since 5th, N. 37° W.

nineteen three fourths miles. I have always felt that 75° would be our Rubicon, and now we have passed it, and may hope for better things. Soundings forty-four fathoms, a rapid drift to N. by E. Happy omen. Mr. Newcomb while out to-day noticed a piece of ice of this year's formation, he thinks, with icicles a foot or more in length, from which drops of water were ready to fall. These icicles were hanging from the south side of the piece of ice, and were sharpened to quite an edge southeast and northwest, as if cut by a blast of drifting snow during our late heavy southeast winds. The sun was about 5° above the horizon, the temperature of the air minus 9°. He brought a piece on board with icicles depending, and upon melting it I tasted some of the water, and found it unpleasantly salt, accustomed as I am to distilled water. The specific gravity proved, however, to be 1.0005, and that is fresher than anything we have seen thus far from seawater ice. Now, as I am convinced that the continued consumption of just such water (if no worse) has had much to do with the heretofore unaccountable outbreak of scurvy in previous expeditions I am determined to bottle this specimen and take it home, as also a specimen of the distilled water such as we have used nearly always; and in America to submit the first specimen to medical experts for examination and analysis, asking these questions: "How long, under the peculiar conditions of life in the Arctic regions, could men habitually use that water without becoming scorbutic?" And, "Would it not be wonderful (or at least strange) if men continued to drink it and did not become scorbutic?"

February 15th, Tuesday. — The wind veered to S. S. W. and blew twenty miles an hour at six A. M., and

then veered away and grew lighter, so we cannot be said to have had a gale.

To our unspeakable astonishment the lead line gave fifty-seven fathoms, and a sticky mud at the bottom, with a very rapid drift E. by S. Can it be possible that we have left the Siberian shoals and are on the border of a Polar Ocean? I almost expected to see the ice melt! Our soundings were at ten A. M., and at 6.30 we established her position in $74^{\circ} 59'$ and $171^{\circ} 57' E.$, a drift since yesterday morning of fourteen and seven tenths miles S. $70^{\circ} E.$ These occurrences make this a noteworthy day. Magnificent weather, sky absolutely cloudless after nine A. M.

February 16th, Wednesday. — Sunrise at 8.57, sunset at 3.05. The amount of sunlight we now get is very charming after such a long spell of being without it, and as our dawn light begins at six A. M. and lasts until six P. M., we are able to see enough day to make the night less wearisome when it comes. At my end of the mess-table we have had no artificial light at our three o'clock dinner, and I smoke my after-dinner pipe in a twilight that is conducive to enjoyable thinking. Before the sun had been so long with us last year we captured our first bear, but this year we have seen only fox-tracks thus far. In this part of the world at this season there can be no food for foxes, and they must depend on what Bruin leaves them from the hunting of seals. So as we see fox-tracks bears ought to be in our neighborhood.

February 17th, Thursday. — It is so long since we have seen a cloud that we nearly forget what it is like. A remarkable mirage prevailed all day. The horizon was raised all around like a solid wall resembling cliffs of a sea-coast. The hummocks, of course, made this

appearance, and it was not difficult to imagine a broad expanse of water at all points resting against the foot of these cliffs.

February 18th, Friday. — This morning, between ten and eleven, Danenhower (who is now able to get a bit of sun and fresh air occasionally), while walking in the trench under the port quarter, saw a bear close to. He gave the alarm and away went the dogs pell mell, headed by the "hoodlums," and, overtaking Bruin, fought him and killed him before anybody could get near. Tom and Alexey's dog got the bear by the throat and held him while the rest of the pack sailed in. When the carcass was brought alongside it really looked like that of an overgrown cat, it was so small. She (for he was a she) was only five feet six inches long, two feet two inches high, three feet two and a half inches girth, and weighed only one hundred and twenty-nine pounds. Wilson easily tossed her on his shoulder and carried her in. We suspect from her small size and poor condition that she is the survivor of the family of mother and two cubs we fired at and wounded August 26th. Our theory is that mother and one cub died from their wounds, and the survivor has hibernated near us all winter.

When Aneguin came back from his cruise this afternoon he astonished us considerably by the news that he had found a "house" big enough for two men to live in about two miles southeast of the ship. I think he was considerably frightened at his find, and looked upon it as something uncanny. By close questioning it was elicited that the house was of canvas, that it had a piece of brass served in it; and then it occurred to us that he had found a piece of tent-awning we had left behind in the smash up November 25, 1879. The

“piece of brass served in it” meant a brass eyelet, one of a number along the edge for lacing. Though many times since we have hunted for our old resting place, it has remained hidden. Chipp will go out to-morrow with a sled and bring in the valuable relic. Another absolutely cloudless day, except for a suspicion of stratus clouds seen by the doctor at three A. M.

February 19th, Saturday. — Our anticipations of yesterday with respect to the house which Aneguin found have been verified. Chipp went out this morning and brought the trophy into the ship. He found it about three miles southeast of the ship, and in a location which gave evidence of about six feet of the surrounding ice having melted last summer. Nothing was found of two barrels, which, being empty, were not looked after when we broke away.

February 20th, Sunday. — The bright sunlight seems to make us forget that we have gone through anything in the past, and makes me at least hope implicitly in a successful future.

February 22d, Tuesday. — Washington’s birthday, and celebrated by us for the second time north of the Arctic Circle by mast-head and flagstaff ensigns and the jack forward. With all patriotic solemnity we hoisted them at sunrise and hauled them down at sunset, and “another of them was gone.” A bright, cold day; temperature, minus 40.5°.

February 23d, Wednesday. — Bright and pleasant weather, and the cheerful temperature of minus 42.5°. Light airs from southward and westward, then a calm; and afternoon a light breeze springs up from the eastward with which the temperature rises, and I hope will continue to rise, for I do not want our good average for February to be spoiled.

February 24th, Thursday. — Another instance of extraordinary change of temperature in twenty-four hours. Yesterday we had minus 42.5°, and to-day we get minus 1°! Who wants more than that to make him happy? A fine easterly gale, however, explains the warmth. Although the clouds of drifting snow threaten to bury us as usual, we are somewhat surprised at having good large flakes fall at nine P. M.

February 25th, Friday. — A gale blowing all day from E. S. E., and temperature steadily falls to minus 14°.

I am strangely inclined to think that we are skimming along close to the line of comparatively deep water, and while making some northing are making more westing, agreeably to the shape of the coast line of Siberia, and that when the ice in these rivers breaks up we may be shot out to the northward far enough to get into water sufficiently deep to give these floes a chance to break up and expose some navigable lanes.

Nous verrons.

February 26th, Saturday. — Latitude 75° 11', longitude 170° 31' E., a drift since the 19th of seventeen and three quarter miles N. 56° W. The E. S. E. gale continues twenty-six to twenty-one miles an hour until noon, and after this it moderates, and by midnight has backed to E. eleven miles an hour. The temperature rapidly falls as the barometer rises, and the clouds clear away so that after three P. M. we have an absolutely cloudless sky.

February 27th, Sunday. — I am sorry to record that Alexey is on the sick-list with an annoying trouble. A cicatrice has opened on his leg, having been irritated and inflamed by the tight lacing of his moccasin, — a regular habit with him, — and has become an ulcer of

some magnitude. Apart from the laying up of a valuable hunter, and the additional care to be employed in nursing one more sick man, as well as the constant dread of having to look after two men now instead of one should disaster overtake us, there is created a cause, though not, as we can prove, a reason, for a suspicion hereafter that we were not free from scurvy, much as I have taken pride in our exemption all along. From Alexey's imperfect knowledge of English, and our entire ignorance of his language, the doctor cannot get an exact account of his medical history. But as far as can be ascertained, he had some disorder at St. Michael's which Mr. Newman treated, and from Alexey's description of the effect produced, his hair falling off, etc., it is likely that Mr. Newman dosed him with mercury. At all events, Alexey had at that time several of these sores, one of which, thanks to his tight moccasin lacing, has turned into an ulcer.¹

The probabilities — in fact, the certainties — are that the man was never so well cared for, so regularly and properly fed, so comfortably housed, and so little worked in his life as he is now ; and in any other place than this his condition would not suggest even a suspicion of scurvy. But, as heretofore, the idea of an Arctic expedition was always inseparably connected, seemingly, with scorbutus ; the fact of this one escaping it entirely would be received with more or less incredulity. Accordingly, the occurrence of this ulcer on Alexey's leg is peculiarly annoying.

The usual Sunday inspection and divine service.

¹ This statement must be corrected. Subsequent inquiry shows that Alexey had these sores before he came to St. Michael's, and was treated by his uncle, who applied pulverized whalebone, etc. He was afterwards treated at St. Michael's with mercury for another disorder, and the original ulcer business and its cause may have been unknown to Mr. Newman.

February 28th, Monday. — We had some little disturbance to-day in the jarring of the ship at one, eight, and nine P. M., and the frequent snapping and cracking of the ice. After so much E. and S. E. wind, I suppose some slack place has been made in those directions; and as we have to-day fresh N. W. winds, a closing up has occurred, which would explain the disturbance. Some snow and fog indicated openings in the ice in our neighborhood, and the barometer and temperature readings were in accordance with such changes going on. Soundings in thirty-nine fathoms; moderate drift S. This is unpleasant, for I want to hold on to our latitude until I can get some good out of the Siberian rivers, to wit: pushing us and our ice to the northeast to deeper water where this summer we may hope for a release.

By measurement the ice around us was found to be six feet thick, direct growth since August 31st.

March 1st, Tuesday. — The medical examination being concluded to-day, the doctor handed in his report. It is, on the whole, satisfactory. Six are in good condition, and two (Mr. Danenhower and Mr. Dunbar) fair. All hands forward are in good condition except Alexey, and his condition is fair. The doctor reports that a want of tone prevails; that is, we are not as vigorous and could not stand exposure and prolonged muscular exertion as we might have done when we first reached the ice. As far as Alexey is concerned, the views of the doctor and myself are fully set forth on the preceding page. To-day we have a moderate northerly gale.

March 6th, Sunday. — A bear of 374 pounds weight was captured to-day after a most tremendous fight. At about eight A. M. he came up from astern, and when about five hundred yards distant was sighted by the dogs, about twenty of whom made for him and brought

him to. He took to a hummock to have a commanding position, and there the dogs charged him, while Nindemann and Wilson hastened to the scene with rifles. He fought tooth and nail, and flung the dogs off right and left with many a cut and scratch. Chipp saw the fight from the deck-house, and says that when the dogs charged the fur would fly, and then a dog would be sent through the air, torn and repulsed. When the men came within range Nindemann fired, the ball passing through the bear, glancing against some bone, and, to our great sorrow hitting poor Plug Ugly, entering his lungs and causing death. It was not until Wilson fired that Plug Ugly fell, and it was at first supposed he was killed by Wilson's shot. But our usual post-mortem showed a flattened Remington bullet in the dog's lungs, and the entrance and exit of the ball were found in the bear's carcass. Wilson's piece was an English rifle.

When injuries came to be examined, we found it a very costly bit of bear. One dog killed, Plug Ugly; Prince with his back and fore shoulder cut, where Bruin had caught him in his mouth and flung him; Tom had a long gash on his rump, which had to be sewn up; and Wolf, the third hoodlum, had a long cut from his rump to his stomach, requiring considerable sewing. Bingo was torn in his side in two places clean through to the intestines, making plenty of stitching necessary. One of Alexey's dogs had a gash in his throat from the claw. Snoozer had his mouth lengthened by a claw on the cheek. Smike was torn in two places, and cuts of less importance were more common. Such a fight we have never had. The bear was seemingly a mother of recent date, for she was plentiful in milk (in fact, smaller tracks were afterward found alongside her trail), and quite fat and otherwise in good condition.

Ordinarily they do not fight much, generally jumping around and around to keep face to the dogs, but this one had her war paint on with a vengeance.

Something is getting ready for a move, for three times to-day, seven A. M., two and four P. M., the ship was heavily jarred, and the grinding and snapping of the ice occurred alongside of us, though nothing could be seen.

March 8th, Tuesday. — We have had a screamer of a S. W. gale all day. Away we flew to the northeast, our soundings deepening to thirty-six and one half fathoms. What little was left visible of the ship on her starboard side was promptly buried by the clouds of drift, and we looked like three masts rising out of a snow-bank; even the decks were piled up, and one had to climb over the snow barricade that the wind had heaped up against the porch door.

March 10th, Thursday. — A light S. W. breeze and steadily increasing temperature. Just as the wind changed, at three P. M., the ice commenced to jar the ship. The sound of our going over some underlying pieces was apparent, and considerable strain seemed to be received. Five hundred yards east of the ship a long crack occurred running north and south, and the ice beyond immediately commenced crowding in, breaking up edges and piling a ridge all along its length. This advance looked something like our old experience of November, 1879.

March 11th, Friday. — Our days are steadily lengthening. At nine to-night the twilight arch was distinct above the northwest horizon. At midnight brilliant flashing of an auroral mass of curtain segments west between horizon and zenith. At the same time I remarked what I have frequently heard before, noises

from the ice all around me like the singing which a whiplash makes in cutting through the air, or a noise produced by switching a rattan.

March 12th, Saturday. — Latitude $74^{\circ} 54'$ N., longitude $171^{\circ} 16'$ E., 320 miles northwest of Herald Island, — a drift since the 5th of ten and one half miles N. 80° E. The temperature remains uniformly low and minus 43° . Sunrise, 6 h. 18 m.; sunset, 5 h. 25 m.; early dawn, three A. M. — northeast; last twilight, nine P. M. — northwest. Considerable fog along horizon from nine A. M. to six P. M. The ice five hundred yards southeast of the ship got under way between six and eight A. M. and made quite a disturbance, and between noon and one P. M. the screaming and grinding commenced ahead. This motion of the ice, after our long quiet of over a year, is incomprehensible, unless by some happy chance we are as close to the northern edge now as we were to the southern edge then of a great icy barrier.

March 13th, Sunday. — Sunday comes in the ordinary course of events, and finds us still here or hereabouts. Inspection is made as a matter of routine, for things do not change much from day to day. The holds and store-rooms are showing large holes, and our provisions are steadily diminishing, with nothing to show for the consumption. We have been an expensive Arctic expedition in view of the results, for, like unworked horses, we have “eaten our heads off and have accomplished nothing.”

Divine service followed at 1.30. As an evidence of our vagaries in the Arctic we have taken to flying kites, Chipp of a scientific kind for electrical effects, and the Chinamen of a fancy kind for their own amusement, and in their enjoyment of the fun they amuse the whole ship's company.

March 14th, Monday. — Surprised by sounding to-day in fifty and one third fathoms. Our position is found to be in latitude N. $75^{\circ} 5'$, longitude E. $171^{\circ} 36'$, showing a drift since the 12th of twelve and three quarters miles N. 28° E. Temperature minus 43° . Dug away snow from the port rail amidships, to enable us at least to see over the ship's side, — something we have long failed to do.

March 15th, Tuesday. — An unusually bright and pleasant day, but very cold, minus 45° . By counting the stroke of our bilge-pump for twenty-four hours we determine the amount of our leak to be two hundred gallons per hour.

March 16th, Wednesday. — Astounded to-day by getting sixty fathoms of water, the deepest yet obtained by us north of the Aleutian Islands. By the sun at noon, we find we are in latitude 75.7° , and by Venus at 8.30 P. M. we get our longitude $171^{\circ} 48' E.$, showing a drift since the 14th of N. 59° E. 3 miles.

It is worthy of remark that the increase in depth is abrupt. On the 13th we had thirty-eight and one half fathoms, and on the 14th fifty and one half fathoms. Yesterday we had forty-six fathoms, and to-day sixty. I think the water to the northeast will be deeper the further we go, and my prayer is that we may go on until we come out into the Atlantic Ocean.

March 17th, Thursday. — The wonder is increasing. Sixty-seven fathoms to-day, and a slight drift N. E. May it keep up and increase in rapidity until we come up into the Atlantic very early in the summer. A mysterious disappearance of one of our dogs, Skinny, is now to be mentioned. He has been growing thin so regularly since he first came to us that of late there has been but the frame of a dog visible. Now he cannot

be found, and it is supposed that he has wandered away somewhere and become covered with drifting snow and thus buried. He never would have been of any use to drag a sled, but still it is unfortunate that his end should have occurred in this way.

The cheerfulness and persistence with which our two Chinamen attend to flying their kites would lead one to suppose that they were on green, grassy fields at home. They make them of all sizes and all shapes, — like flies, like birds with wings, etc., — and as long as there is daylight they are out on the ice enjoying their sport. When work requires their presence in the galley or cabin they tie the kite-string to a boat davit, and leave the kite flying until they can run out again to watch it. I verily believe they would cheerfully tear up all their clothes to make kite-tails of.

March 18th, Friday. — Soundings in sixty-six fathoms. Sunrise at 5.38, sunset at 6.10. Our sick-list to-day received another addition in Dressler, who dislocated one of the bones (os magnum) of his right wrist. While he had his arms full of provisions, carrying them forward to the berth deck, he attempted to open the deck-house door, and in so doing sustained the injury. It will lay him up for a week, but beyond that there is no reason to be concerned.

Alexey is improving, I am glad to say, his ulcers granulating all right. There is no reason to suspect any scorbutic taint in his case.

Danenhower pulls along just the same, sometimes better and sometimes worse. There is no reason to hope for his improvement until he can be operated on ashore, and no reason to fear unless we should be turned out of the ship and he should fail to stand the exposure and hardship of ice life.

March 19th, Saturday. — Soundings in seventy-one fathoms. Slight drift to N. Observations place us in latitude N. $75^{\circ} 15'$, and longitude E. $171^{\circ} 36'$, a drift of eight and one half miles N. 20° W. since the 16th.

Yesterday I had occasion to speak of sick men and to-day I mention sick dogs. Poor Tom received a severe hurt in the memorable bear fight, for to-day the doctor got a piece of broken bone out of his back, and it would seem that Bruin must have taken him in his mouth and bitten deep before flinging him to one side. It will be a long time before Tom is on duty again. Wolf is mending slowly, his injury giving him a strong disinclination to sit down, however, but this is favorable to his improvement. The other dogs are also improving. Smike was succeeding, by judicious management, in keeping his wound open, but Wilson made him a one-legged pantaloons and clapped it on him, and now Smike is so proud of his clothes that he has forgotten all about his injuries.

March 20th, Sunday. — To-day the sun crossed the line coming north, and I hope he will see us out of all our trouble before he crosses it going south. He showed that we are in latitude N. 75.17° , and that is some comfort.

Inspection and divine service mark this day above others.

March 21st, Monday. — Soundings in sixty-eight fathoms, and an indicated slight drift to N. W. Every time we go northeast we deepen our water, and shoal it when we go northwest. When a good depth consoles us, a light wind sets us west again, and thus heads us off.

This morning we found a track ahead of the stem, and one leading astern, as if our floe were split in a line

with the keel. At the same time we noticed that our snow walls were an inch or two away from the sides, as if an opening and spreading outward were about to occur. We can but await developments, as we did in the fall of 1879, for I have long since ceased to build any castles in the air on probabilities or possibilities.

March 22d, Tuesday.—The doctor communicated to me to-day some matters in relation to Mr. Danenhower's case, which I consider proper to enter here at length. The doctor considers that the diseased eye is in such a condition that no improvement will take place in it unless a very serious operation is performed, though no assurance can be given that this operation will be successful. Still, under favorable circumstances of surroundings, appliances, and hospital treatment the operation would be considered advisable, and no hesitation would be felt. Here, however, the situation is unfavorable. The doctor has no proper instruments in the first place; and finally, if any mishap should occur by which we were turned out on the ice without a ship, the eye would be in a worse condition and would suffer more than if let alone. For as it now is, it can be kept at least from growing worse. Danenhower can see with one eye, the right; is in fair physical condition; is not absolutely helpless; and, in the event of disaster, stands a better chance of safety than if he were disabled by an operation of which the ultimate benefit is more or less doubtful. I have no hesitation in approving the doctor's views, and in asserting that Danenhower's case is best dealt with in leaving it judiciously alone.

It would be difficult to find a more perfect day than we have had. Light airs, clear sky, a bright sun, and hard, firm walking, go to make up an Arctic Paradise. So bright and warming was the sun that the tempera-

ture, minus 39° , was forgotten ; and after walking long enough to get the blood in circulation, such a glow of heat was felt as tempted me to throw off my fur coat and continue without it. I did not do it, however, for no doubt I should have had my enthusiasm cooled. I see very clearly we shall have to come back to snow spectacles before long. Such a dazzling diamond dust as the floe presents under the action of the sun's rays is too trying for long endurance. And yet the sun has only 15° or so altitude. Sunset 6.39, and considerable daylight even at midnight.

When the air is perfectly dry, and the sky cloudless, the intensity of the sun's rays, even in these low temperatures, is wonderful. In fact, as we can have a dryness of atmosphere here that is unusual in the tropics, except in deserts, the sun's heat may be more uncomfortable here on the same day than in places much further south, though in the latter case the temperature shown by a thermometer may be as much above zero as here it is below. It is a fact verified by our experience that we have had a greater sensation of cold in the summer, when dampness and fog are common, than in the winter, when the atmosphere was dry, although in summer the temperature was from 30° to 40° plus, and in winter from 30° to 40° minus.

March 23d, Wednesday. — This month seems to hold on with cold weather very steadily, still minus 39° . We had very much warmer weather last year at this time, though of course it should be remembered that we have not had as great a degree of cold at any one time this year as last. However, the air was so dry, the breeze so light, and the sun so intense that we do not complain of to-day, for it has seemed delightful. With the sun above the horizon for fourteen hours, strong twilight

for six hours more, and even a dawn light at midnight, we can no longer be oppressed by darkness. It is so hard to realize that we are unable to go ahead. What would we care for labor if we could only accomplish something by it? Nineteen months of inactivity and failure is a long time and a severe trial, but I am satisfied we have all the zeal and energy needed to make a dash when we are given the chance.

March 24th, Thursday. — Soundings in sixty-four fathoms, light drift W.; it is again evident that the deep water is northeast of us.

March 25th, Friday. — Dressler has so far regained the use of his wrist as to be returned to duty. But as I am quite convinced that Chipp is overworked, and as he looks wretchedly thin, I have directed him to discontinue taking three A. M. meteorological observations, and I shall hereafter take them myself.

March 26th, Saturday. — And thus do we drag our weary length along, and seemingly no nearer a success. Is there never to be a change to this simply horrible monotony? Soundings to-day in sixty-one fathoms; slight drift W. S. W.

March 28th, Monday. — Latitude $75^{\circ} 27'$ N., longitude $170^{\circ} 26'$ E., and a drift since the 19th of eighteen miles N. W. We are to-day 350 miles northwest of Herald Island. As may be seen we have, for some days, been having cold mornings and evenings, and considerable rises of temperature in the middle of the day. It may be that the winter is breaking up, or, poetically speaking, "lingering in the lap of spring."

We have been quite excited to-day about ice openings. At six A. M. masses of dark vapor were rising in clouds from north northwest. Around by north to southeast and from aloft a very large opening could be

seen. Toward four P. M. another opening occurred in the southwest, and the old lead one eighth of a mile astern (north) opened also. All the hunters were out, of course, and made for the water. But three seals were seen, too far to shoot at, and no bear-tracks. By using a glass from aloft, ice could be seen across this large opening to the northward. So we were not on the edge of an open sea, as we might have hoped. Generally speaking, however, the ice is full of small cracks, and it seems as if a good southwest blow would send it streaming away to the northeast without any difficulty, and getting these fields into deep water break them up, and so allow us a chance to get our poor ice-ridden ship under way. We had quite an alarm about Wilson, who, accompanied by his satellite Smike, started off at the first sight of water. Not coming back by six P. M., though the recall had been hoisted for two hours, Erickson and Starr were dispatched in search of him. Eight P. M. came and no Wilson, and I was about to send out large parties in various directions, when the man arrived with Smike. We had next of course to send for Erickson and Starr.

Wilson had crossed a crack before it opened, and on his way back he found himself headed off. Consequently he had a five mile walk over rough ice, until somewhere on our starboard quarter he could get across and make his way home.

March 29th, Tuesday. — As if by magic every ice opening of yesterday is closed to-day, and not a drop of water is to be seen. A light N. E. breeze veers to E. N. E. and to S. E., and the ice is all solid again. To the southwest of us it came together with some force, for a ridge of broken lumps marks the line of closing.

April 1st, Friday. — Our spring and summer routine

goes into effect to-day. But one item needs especial mention, and that is, "watch below to go hunting." This, it will be observed, insures every man going on a hunt once a day, and, incidentally thereto, the securing of enough exercise to prepare him somewhat for possibly greater exertions.

April 7th, Thursday. — Seventy-two fathoms, and a rapid drift N. N. E. The faster the better, for I am convinced we stand a better chance of breaking out of our ice-prison by getting into deep water. Having finished breaking the ice out of the store-room, we now turn our attention to the deck-house, from which the frost deposit is scraped by bushels and carried away in wheelbarrows.

April 8th, Friday. — Seventy-five and a half fathoms; still deepening, and a slight drift S. S. E. Latitude $75^{\circ} 46'$, longitude $169^{\circ} 57'$ E. A drift since the 5th of eight and three fourths miles to N. 18° E. At six P. M. the ice commenced to open about two miles west of the ship, and by nine P. M. the opening had extended in an irregular curve around by north to north-east, and the condensation caused a thick fog. The water could be plainly seen from the deck-house about two miles distant, the width of the opening varying from a few feet to one hundred and fifty yards. At midnight, however, the opening had closed and a small one had occurred to the southward. The ship received several severe shocks at midnight, presumably caused by the floes coming together.

April 13th, Wednesday. — Eighty-five and a half fathoms, and a slight drift S. S. W. So we go north one day, south the next, until man's patience and endurance almost give way. Is there never to be a change? Dull and gloomy weather, much fog, and water-sky.

April 14th, Thursday. — An opening occurred in the ice about five hundred yards ahead of the ship, and extended in an irregular curve around her bows for several miles. Bear-tracks were seen, and one seal was brought in. As this is the time of full moon, the question again comes up are these ice openings due to tidal action?

April 15th, Friday. — Eighty-two fathoms; moderate drift N. W. Latitude $75^{\circ} 52' N.$, longitude $169^{\circ} 56' E.$, — a drift since the 12th of ten and three fourths miles to N. $68^{\circ} W.$ Evidently the slack water or slack ice exists to the westward, for we go so readily that way. Another dog dead, I am sorry to say. Dan, the dog who obligingly furnished a tape-worm to our collection, has departed this life, and we now mourn his loss. By measurement to-day in the most accurate manner, we find the ice to have attained a thickness of eighty-four inches direct freezing since August 31, 1880.

April 16th, Saturday. — Evidently we have not got over winter yet (minus 26°), and I must say it is a discouraging realization. This is worse, by long odds, than last year, and does not promise one half as much.

Eighty-four fathoms; slight drift W. N. W. Latitude $75^{\circ} 53' 30'' N.$, longitude $169^{\circ} 45' E.$, — drift since yesterday N. $53^{\circ} W.$ three and one fourth miles. "Westward ho!" and "Go West, young man!" are clearly applicable to us.

April 19th, Tuesday. — Occasionally we have something to excite us, but unfortunately it is not pleasurable excitement. To-day the steward and cook started off at 2.30 on their walking hunting exercise, but did not come to time when the usual recall was hoisted at five P. M. For one result, we in the cabin were for a

long while without supper. Finally, at 7.30 P. M., the steward came back alone and greatly excited, his explanation being such a confused account of bears, dogs, cook, and guns as to bewilder us completely. When he calmed down, we managed to get at the following: "He left the ship with the cook and one dog, went off to the westward, and at one half mile distance saw a fresh bear-track. While following it up, and going over young ice six miles from the ship, saw Prince and Wolf on a hummock; then saw a bear. Steward fell down among some rough ice, and a piece fell on his back and held him down, else he would have shot the bear (?). The cook's gun would not go off. Cook got the ice off steward's back, and helped him up. They both ran three or four miles after the bear and dogs; then saw the bear again standing on a hummock and fighting the dogs. Cook's dog came back upon being called. Bear was too far off to shoot. Cook then said, 'It's about six or seven o'clock; you go on board and cook some supper.' So steward came back alone, while cook kept on. Was out of sight of ship, but after coming back one half mile got on hummock and saw a little bit of mast, and so came in, seeing another (?) bear-track. Knew he should not have disobeyed order about not going out of sight of the ship, but thought he ought to kill that bear and save the dogs." Of course, I was anxious now about the cook. To send to look for him was like looking for a needle in a haystack. No direction could be selected, because a bear chased by dogs, chased by a cook, would no doubt be too much pressed for time to adhere to a compass course, and as the wind was blowing the surface snow along in low clouds every print would soon be filled up. So nothing was left but to wait. At midnight along came the cook with but

one dog, and he was exhausted. I made him drink a half tumbler of whiskey the first thing, and then questioned him; but he was so excited, or tired, or frightened that he immediately commenced to cry, and I packed him off to bed.

When he became calm, his story agreed with the steward's, and supplied the following additional details: He found a seal, which the bear had been eating, minus its head and shoulders. The bear and dogs would fight every now and then, and the dogs were bleeding. Thinks he went fifteen (?) miles away in chase before he gave it up. Prince and Wolf were still following the bear when he saw them last. Cook tried to drag the seal in, but was too fatigued, and had to give it up. Knew he should not have gone out of sight of the ship, but felt he ought to get the dogs back.

So, as the case stands at midnight, two of our best dogs — in fact, our two best dogs — are missing. Wolf is barely discharged from the sick-list before he is again on the war path. A very curious feature of the whole business is that no one took these two dogs away with him, and our assumption is that Prince and Wolf must have seen or scented a bear, and have started off on the hunt on their own account. Fortunately Tom, the third of the gang, is not out of the hospital yet, and seldom is let out of the deck-house, and never unaccompanied, or we might now be lamenting the loss of three dogs instead of two.

April 20th, Wednesday. — Immediately after dinner, Ericksen, Wilson, and Dressler, accompanied by dogs Smike, Snoozer, and Kasmatka, started off on a search for our missing dogs, but came back about 8.30 with no success. They found the tracks and followed them about ten miles, and, singular to say, the bear seemed

to have come down to a walk, with a dog on each side of him. Possibly all three were so fatigued that they had declared a temporary truce. I say the men followed the tracks for ten miles, but double that distance would be nearer the distance traveled. When they started to return, they were as far as that in a straight line from the ship. The ice at that point was all in motion, grinding and groaning to a fearful extent, and Ericksen, obeying orders, ran no risk of being cut off. The tracks were still visible, showing that the bear and his two satellites were continuing south. At 7.05 P. M. the ship received a jar as if striking in going over a submerged piece of ice.

April 21st, Thursday. — Latitude $76^{\circ} 2' 34''$ N., longitude $167^{\circ} 45' 30''$ E., — a drift since yesterday of ten and one half miles to N. 53° W. My courage is all aroused again, for if we go on now, as seems not improbable, we may accomplish something yet. A gale is blowing from east all day, and with no sign of a let up. Soundings in eighty-one fathoms, and a rapid drift indicated W. N. W. Herald Island is now 400 miles S. 43° E. from us. I hope our two missing dogs have not gone to look for us there.

April 25th, Monday. — A clear, bright day, and I am enabled to get good sights for position, with the following result: Latitude $76^{\circ} 19'$ N., longitude $164^{\circ} 45'$ E. A drift of no less than forty-seven miles N. 69° W. since the 21st. This is the greatest drift we have yet to record, and though 147 miles would be more satisfactory I cannot complain, though I hope the time is not far distant when 147 miles will be an ordinary day's work.

So much theorizing has been done this cruise, that one more theory will not be amiss, namely, that the

New Siberian Islands are acting as the breakwater or stop to the regular onward flow of the ice. If we can get well to the northward of their position we may come to more water spaces, and have better chances of navigation, and so work our way afloat. After such long waiting we surely have earned some reward.

Soundings in thirty-five fathoms, rapid drift S. W. by W. It is not very encouraging. E. N. E. to N. N. E. represent our winds. A disgusting state of temperature for this time of year. At nine P. M. zero again stared me in the face, and at midnight minus 6° was as calmly registered as if it were a temperature to grow roses in. What a country this is! It would be difficult to make anybody understand what a dreary waste of ice surrounds us. We are so accustomed to it that its monotony is its only disagreeable feature generally; but at times its wildness strikes deep into us. One can go aloft and thus extend his horizon, but he only adds to the amount of wild scenery. Nothing but ice, day after day. Hummocks large and small, ridges high and low, a rough, tumbled mass over which there is no path, and through which there is no road, and in the centre of the picture a poor little ship buried to her rails in snow-drifts, — a stranger in a strange land, indeed! As day adds to day the sameness becomes wearing, and after our long experience of it, it is perfectly maddening. Sun above northern horizon at midnight.

April 26th, Tuesday. — The most marvelous thing to-day was the return of our dog Prince at six A. M., very thin, and evidently exhausted. He has been gone within a few hours of a week. What has become of his companion Wolf, we know not; though, if Prince could speak, no doubt he would tell us a story of adventure and suffering. Our presumption is that Wolf

was badly hurt by the bear, and that Prince stayed by him until he died. It would not surprise us, however, to see Wolf come straggling along yet, but judging by Prince's condition he had better not defer his arrival much longer.

April 27th, Wednesday. — For the first time we get some diatoms in our Sands cup, and of the order *coscinodiscus*. As these things are supposed to be a river growth, it is fair to presume that we have just come within the area of the deposits from the Kolyma River. Let us then hope for something from the much lauded velocity of the spring freshets of Siberian rivers, for that is about the only Arctic theory that we have not exploded.

April 30th, Saturday. — Ice found to be seven feet six inches in thickness, direct freezing since August 31, 1880.

May 1st, Sunday. — The month of May enters promisingly, indeed, — a temperature of minus 2° being a cheerful indication of future spring; for I suppose I am not very far wrong if I consider we are yet enjoying winter. At five P. M. we got a sharp shock under the stern, and soon after we found the ice open about one hundred and eighty yards from the ship, and running in an irregular bow-and-quarter line as far as we could see it through the rough ice. It gave a chance for Chipp to make some interesting measures of ice thickness which I put in my general items book.

May 2d, Monday. — Surely in no other place in the world north of the Equator have I heard of a temperature of minus 10° on the 2d day of May.

May 3d, Tuesday. — In a little book called "Reindeer, Dogs, and Snowshoes," there is a remark that in Siberia there is no spring — the transition from winter

to summer being abrupt. We must be having Siberian weather, for how else can we account for a temperature of minus 12° on the 3d day of May? Our men to-day were at work clearing away the snow-banks surrounding us. The drifts have almost buried us, and we are anxious to see our black sides once more. Shall we ever see them above the surface of an open ocean again?

May, 4th, Wednesday. — A flock of ten wild geese were seen flying west this morning, and some ducks also flying in the same direction in the afternoon.

May 5th, Thursday. — The pleasantest thing I have had to record for some time is an occurrence of to-day — the capture of a bear. This morning, while the men were out on their usual walking and hunting exercise, Wilson and others saw a bear about a mile ahead of the ship, and our fine dog Prince at once made for him and seized him by the hind leg. Bruin promptly wheeled to confront his assailant, when, according to Ericksen, Prince shot ahead of him cutting off his line of retreat until Wilson, one hundred yards distant, got a bullet in that dropped him. A splendid shot, and a piece of great good luck for us. Weight 790 pounds; his stomach was empty but for one tobacco quid picked up on his way.

May 6th, Friday. — At one and four A. M. the ship received some severe shocks, and in the forenoon, when we came to look around, we found that the lead, one hundred and eighty yards off, had partially closed; that a crack extended ahead in line with the keel; one from our starboard quarter toward the one hundred and eighty yard lead, and several between the bow and beam on the starboard side. Not of importance any of them, unless as indicating a future line of opening. A flock of ducks flying west seen to-day.

May 7th, Saturday. — Brisk east wind. The only effect seen resulting from this brisk wind was a re-opening of the one hundred and eighty yard lead and some water spaces a mile on the starboard bow and astern.

May 9th, Monday. — A pleasant figure in temperature at all events. Maximum plus 17°. Soundings in thirty-seven fathoms; no drift. Light E. S. E. breeze. And still the days succeed each other, and no signs of a change. Twenty months of this imprisonment is monotonous indeed.

If our poor dogs could talk they would most likely express their astonishment at the small amount and great variety of food offered them for consumption. It is not only a surprising but a wonderful matter that we have kept them alive so long. Fish was very acceptable while it lasted; pressed scraps (horse flesh, etc.) not so good, but yet not to be despised; and seal and walrus meat were excellent substitutes. But it is over a year since we have seen a walrus, and such few seals as we have caught since last summer have been reserved for our own eating. The entrails of our few captured bears were but a hasty lunch, hardly worth mentioning. For a long time, therefore, our dogs have been on short commons. Condemned oatmeal was given them while any was on hand; then condemned corn meal and suet; then spare corn meal from naturalist's stores, with suet added; and we are now about to try desiccated potatoes and suet. No doubt they think, "Well! what next?"

May 11th, Wednesday. — One uncomfortable result of the high temperature is making itself apparent, namely, a thaw within the cabin. The accumulation of frost in the window-pockets, and more particularly

between the ceiling and bulwark, is melting slowly but steadily, and as the ship has a list of 2° to port, several little streams trickle out from the water-ways in my room and from under the chart drawers, and make unpleasant little puddles. If dried up as soon as they are seen no great inconvenience results; but if not earlier attended to they spread and find their way down below through the ventilating holes bored in the deck, or in some cases, as I am sorry to see, through the deck seams. I do not think that such was the case last spring.

I frequently wonder how long a body of men could stand this enforced monotony of existence without giving up altogether. There is no way of solving the problem except by our own experience, for we have had a greater amount of it thus far than any others on record. My own sensations are those of unmitigated disgust, and I suppose the sensations of others are similar to my own. I do not care to commit to paper even my own ideas and feelings. The probabilities are that I shall never forget them, and that hereafter they will be pushing themselves to the front of my mind in spite of my efforts to keep them back.

May 13th, Friday. — To-day I observed Aneguin cutting up a curious looking thing like a block of pasteboard for our dogs, which were standing around expectantly. Upon asking him what it was, he replied, "Pie." "What?" said I, wonderingly. "Pie," said he. Curious to know how pie ever came in that shape, I examined carefully a package, and just managed to decipher the word "pumpkin," and, of course, at once knew it was a condemned package of dried pumpkin. As Aneguin has eaten pumpkin pie on board, he at once gave the name of pie to the vegetable itself, and

as "pie," therefore, it was served out to the dogs, no doubt to their admiration of man's ingenuity in finding food for them.

Alexey's case still hangs on curiously enough. The ulcer in his leg heals very stubbornly, and does not look healthy in healing. Otherwise he is in excellent condition, eats well, sleeps well, looks well, and feels well, and has no more scorbutic symptoms otherwise than I have (who have none at all). Bright and cheerful is he also, and save for this stubborn ulcer would be on duty as before.

May 14th, Saturday. — A flock of eider ducks seen flying west during the forenoon. An almost continuous snow-fall to still further enliven us.

May 15th, Sunday. — At last there seems to be a disposition on the part of the weather to grow warmer, and it is high time. Full moon occurred on the 13th, and we have been accustomed to have our coldest weather at that phase.

Inspection and divine service as usual.

May 16th, Monday. — LAND! There is something then besides ice in this world. About seven o'clock this evening Mr. Dunbar, who usually winds his way aloft several times a day, could hardly believe his eyes when they rested on an island to the westward. He called Chipp to look at it, and Chipp saw it was land sure enough, and sent Ericksen to inform me. I had just finished working out our position when the extraordinary news came, and was writing out the result: Latitude $76^{\circ} 43' 20''$ N., longitude $161^{\circ} 53' 45''$ E., a drift since the 14th of five and a half miles to N. 16° E. Of course I dropped my books and ran up to the fore yard, and there, sure enough, I saw a small island one half point forward of our starboard beam,

the first land that has greeted our eyes since March 24, 1880, nearly fourteen months ago. And our voyage, thank God, is not a perfect blank, for here we have discovered something, however small it may be. Some fog is resting over it, and to the right hand or northward of it, and we do not think we see all of our wonderful landfall. Bearings I take at once, and find *our* island bears S. $78^{\circ} 45'$ W. (magnetic), or (the variation being 18° E.) N. $83^{\circ} 15'$ W. (true), but we can do nothing more. Its distance we cannot estimate. If low land comparatively, it may be forty miles distant (see our idea of Herald Island's distance), and if high land seventy to eighty miles. But after a number of days, if we change the bearing of it to some extent, I can compute its distance, and determine if, and in what manner, we can land upon and take possession of and explore our discovery. Cooped up as we have been for over twenty months, we shall enjoy getting our foot on solid earth or stone as much as if it were Central Park, for it will be a change. But whether it will be earth or stone we do not know of course. What this poor desolate island, standing among icy wastes, may have to do in the economy of nature I do not know, or in fact care. It is solid land, whether of volcanic origin or otherwise, and will stand still long enough to let a man realize where he is. Moreover, this must be the spot to which the ducks and geese have been steadily flying, and if we can get some of them for a change to our canned meats, what a treat! And then bears must swarm on *our* island! In fine, this island is to us our all in all. We gaze at it, we criticise it, we guess at its distance, we wish for a favoring gale to drive us towards it, and no doubt we would accept an assertion that it contained a gold mine which

would make us all as rich as the treasury without its debts. I believe most of us look carefully at our island before we go to bed, to make sure it has not melted away. Fourteen months without anything to look at but ice and sky, and twenty months drifting in the pack, will make a little mass of volcanic rock like our island as pleasing to the eye as an oasis in the desert.

Beside this stupendous island, the other events of the day sink into insignificance.

May 17th, Tuesday. — Our island continues to be the cynosure of all eyes, of course, and as the fog which hung over it yesterday has disappeared to-day, we are able to define its appearance better, the white portion which the fog hid yesterday showing as a snowy slope extending back to some distance. The shaded portions seem to be rock, with clefts or gulleys in it, in which snow has lodged. The highest and further corner seems to be a volcano top. We are watching the land anxiously enough, and getting our position by observations daily, but of course in one day we have not altered bearings at all. That may be a question of weeks, unless we have stiff winds. Sights to-day place us in latitude N. $76^{\circ} 43' 38''$, longitude E. $161^{\circ} 42' 30''$, — a drift since yesterday of two and one half miles N. 83° W., or exactly towards the island.

Soundings forty-three fathoms (mud and pebbles), a slight drift N. by E. being indicated by the lead line. Temperature, maximum, 11.5° ; minimum, minus 5.5° . What lovely weather for the middle of May!

May 18th, Wednesday. — Latitude N. $76^{\circ} 44' 50''$, longitude E. $161^{\circ} 30' 45''$. As we draw ahead of our island, we open out quite a face to the northward, and Mr. Dunbar is quite certain that he saw high land above and beyond it to the westward. My repeated visits to

the crow's-nest show me a strong appearance of high land, but I have not yet been able to say positively that it is not cloud. At one time I thought I could see a connecting snow-line, as if the upper part of our island sloped backward and upward to a higher ridge beyond, but I was unable to see a snow-peak that Mr. Dunbar saw just before I could join him in the crow's-nest. Weather generally clear, bright, and pleasant. An E. wind freshening, and promising a stronger blow for to-morrow.

The ice opened in a crack about five hundred yards to the eastward of the ship, and came together toward midnight, the ship receiving several slight shocks when the ice edges met.

We are favored with an occasional dovekie (black guillemot), shot by some of our people, the luckless bird being attracted by the little lanes and cracks in the ice near us instead of making for the island, where it would be safe. Last Saturday we in the cabin had one apiece for dinner, and I am in hopes of seeing enough hanging to the main boom to have them for dinner fore and aft next Saturday.

May 19th, Thursday. — E. S. E. winds make us move along at a brisk rate, evidenced by our opening out our island's north side. Centre of island bears W. (true).

At 9.30 A. M. the ice quietly opened seventy yards from our starboard bow, and a lane of water about twenty feet in width extended north and south for about three miles, and several other cracks and lanes were visible to the northwest. Whether when we get to the westward of our island the ice will spread and open remains to be seen; but this lane is quite close enough, unless we can use it for an advance. We have a crack under our starboard counter that may connect,

and a crack ahead in the line of our keel as a starter, which may at any time leave our whole starboard side bare.

May 20th, Friday. — Latitude $76^{\circ} 52' 22''$ N., longitude $161^{\circ} 7' 45''$ E., — a drift since the 18th of nine miles N. 35° W. As the island point observed on the 16th now bears S. $78^{\circ} 30''$ W. (true), I can compute the distance by the change in bearing, and the result is twenty-four and three fifths miles (and thirty-four and seven tenths miles on the 16th). The dimensions of it I cannot accurately measure yet, though with an octant I find it subtends an angle of $2^{\circ} 10'$ on this bearing. But from our point of view the island is foreshortened, for I think its greatest length is in an east and west direction. As we draw to the northward, we open out the western face and shut in the eastern face correspondingly, but I have taken the same point each time for my bearing by the course indicator on the bridge. There now seems to be a curious little island off the western end, which looks like a mound with a beehive on it, but I hope soon to be able to say whether it is a separate island or a continuation of the first one.

Toward midnight a strong appearance of land was seen bearing west by north roughly, like an inclined plane, but clouds rested on so much of it that I cannot speak positively.

Soundings in forty-two fathoms; drift N. W. indicated. At this rate we shall soon get to the shortest distance from our island, which I locate by computation of its distance before mentioned to be in latitude N. $76^{\circ} 47' 28''$, longitude $159^{\circ} 20' 45''$ E. E. S. E. gale seventeen to twenty-one miles an hour, and a pleasant temperature plus 16° . At 8.30 A. M. the ship received a blow under water, seemingly near the stern post, and doubtless from some drifting, submerged ice-block.

May 21st, Saturday. — A dull, gloomy day, E. S. E. gale, and I manage to get a meridian altitude, showing that we have made seven miles in latitude at all events. Our island appears only occasionally, but bearing S. 72° W. There seems to be no immediate chance of this blow abating, so it will be a question of waiting to see in what position it leaves us before deciding upon our ability to land upon and take possession of our island.

I am sorry to record the mysterious disappearance of another of our dogs, generally known as Lauterbach, and heretofore recognizable by his having a hairless tail, the result of a scalding accident. He has gone and laid himself away somewhere, for he has been missing several days.

May 22d, Sunday. — At nine A. M. the ship received another severe shock, probably striking ice under water.

May 23d, Monday. — I am sorry to be obliged to record the addition of Chipp to our sick-list. For a long time past he has been in poor condition, growing thin and weak, but insisting on going about and attending to his duty. He has strong dislikes to medicines and medical treatment, and would not believe he stood in need of either. Being overruled in that respect by me, he did take a tonic prescribed by the doctor; but of course, as it was taken unwillingly, under protest, no good was experienced from its use, and it was discontinued. Now nature asserts itself, and he is so reduced, by reason of his failure to eat enough, and so nervous and restless, because of continued loss of sleep, that it is simply impossible for him to keep up, and he is forced to his bed. The doctor hopes to have him around in a few days, but I am not satisfied that a few days can repair the damage already done. Considerable fall of soft, large snow-flakes.

May 24th, Tuesday. — The first thing I heard upon arising this morning was that more land was in sight, and the next thing was that the ice was very slack, with many large lanes of water. The strong appearance of land on the 20th, towards midnight, proves to have been land in reality, — another island being added to our discoveries, somewhat longer (if not less distant) than our first named. Upon going up to the crow's-nest I had a good view of both islands and of more water than we have seen since September, 1879. In consequence of the subsidence of the wind, the ice has



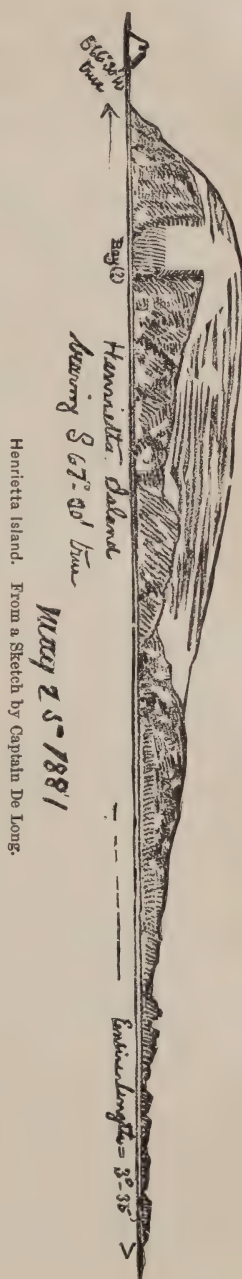
Jeannette Island. From a Sketch by Mr. Melville.

become very slack, and numerous long openings or lanes have occurred, varying in width from twenty to one hundred feet, and in length from one eighth mile to three miles. Unfortunately for purposes of navigation they are not connected, and though having a general northwest and southeast direction, do not lead to anything. Just at this moment I would be contented if by any means I could get the ship into one of these islands for a temporary breathing spell, and a chance to get some game for our supplies; but, unfortunately, I cannot see through thirty miles of ice or blast that amount out of my way. The lanes of water are very tantalizing, for they indicate what might be done if

there were more of them. They seem to be in our neighborhood only, or within a radius of five miles, while the islands are thirty, and say forty miles off, — and from that five miles radius to the islands the ice is as close and compact as ever.

However, we made all the use we could of the openings. The iron dingy, the two kyacks, and the oumiack were put into requisition, and away went parties to hunt for birds and seals, dragging the boats from one lead to another, as occasion required. And while a party of men were thus employed in transporting the oumiack on their shoulders she slipped, and brought so much weight on John Lauterbach (a coal heaver) as to double him up and severely strain his back.

“It never rains but it pours,” is an old saying, and it seems to be proven in our case, for hardly had we prepared ourselves to take care of Chipp when we have another case, Lauterbach. When I saw him being supported back to the ship by a shipmate, I was afraid he had shot himself, or had been shot by a companion, — accidentally, of course, in both cases, — and I ran out to meet him with considerable alarm. For some time it was impossible to find out what was the matter, for the man



Henrietta Island. From a Sketch by Captain De Long.

was in great pain and unable to talk. However, beyond a severe wrench to the small of his back, there was no injury inflicted, and except for his being laid up for some days no serious consequences are to be anticipated.

Now for the land. It is an island beyond doubt; and its nearest point, which I take to be its southern extremity, bears S. $69^{\circ} 30'$ W., and it subtends an angle of $3^{\circ} 35'$, while our first discovery's eastern end bears S. 17° W., and subtends an angle of $2^{\circ} 42'$. I think both islands extend in a west by north and east by south direction. Computation of the position of our first island, from our change of its bearing of the 20th and 24th, would put it more accurately in latitude N. $76^{\circ} 48'$, longitude E. 159° ; and until I can get its bearing due south (true), this bearing of to-day and the 20th are more nearly accurate as to longitude than those of the 16th and 20th.

Latitude N. $77^{\circ} 16'$, longitude E. $159^{\circ} 33' 30''$. A drift since the 20th of thirty-two and one half miles N. 41° W. This is progress indeed,—eight miles a day. Considering that we commenced the year in latitude $73^{\circ} 48'$, longitude E. $177^{\circ} 32'$, we have no reason to complain at the long step we have made,—310 miles N. 47° W.

Soundings in forty and one half fathoms, and temperature comparatively cheerful, plus 27° .

Our engineer's force are occupied in putting together the windmill pump and getting it ready for the summer's work. Chipp is still quite weak, and in consequence obliged to keep his bed. I have taken every precaution to keep his surroundings as quiet as possible, muffling chair legs, not striking the ship's bell, etc., and he has had a peaceful day in consequence.

May 25th, Wednesday.—Our invalids are progress-

ing slowly. Chipp is still very weak, and obliged to keep his bed altogether by the surgeon's orders, as a surety for rest and quiet. Danenhower is just the same, but as he caught a cold some days ago, he is forced to stay below at all times, except at meal hours. Lauterbach is better, though his back will feel the wrench it received for some days. Alexey is slowly getting his leg to heal, there being now but a very small hole open. Otherwise, we are all as well as usual, and all hands are certainly free from scorbutic taint.

Many of our lanes are found closed to-day, the ice having come together during the night. A light film, say one eighth of an inch of ice, formed over the lanes not disturbed. Our islands were in plain sight all day, giving me a chance to get good bearings and angles, which are sufficiently indicated by the sketches on the preceding pages.

May 26th, Thursday. — A dull, gloomy day, with overcast sky, and N. N. W. breezes puffing fitfully. The islands were invisible until six P. M., when they came out from the dull, thick haze. The ice seemed to slack up again to-day, numerous unconnected lanes and ponds showing themselves, but of no use to us yet. Took advantage of the breeze to make the windmill do all the pumping after noon, to the relief of the men on watch, who must have learned to hate the hand-pumps many months since.

May 27th, Friday. — Latitude $77^{\circ} 14' 45''$ N., longitude $159^{\circ} 16'$ E. A drift since the 25th of five miles S. W. This brings us much nearer our second island, and it is very tantalizing to be gazing at what seems a fine bay and not be able to sail into it. Soundings in thirty-nine fathoms, slight drift S. W. On account of light winds had to close the water gates again and fall back upon hand pumping.

May 28th, Saturday. — Soundings forty fathoms, and the state of the temperature is by no means pleasant, maximum 19° , minimum 15° . Our invalids give me the usual anxiety. Chipp is very weak, and I fear it will take a long time to build him up. Danenhower, of course, will be of no use so long as he is in the ship. Alexey slowly recovers. Lauterbach is improving, his back slowly recovering from the strain. But with many things crowding in on me I almost feel that the crucial moment in our voyage is at hand.

May 29th, Sunday. — We get considerable work out of the windmill to-day, and our men are consequently relieved from the endless clang-clang of the hand-pump. Our dull and gloomy weather continues, to my disappointment, for I can get no observations for position. These are particularly desirable now, because I want to fix the position of Henrietta Island. It is very difficult to get good bearings from deck of anything, because the ice-hummocks and ridges are so high and so continuous that it is only here and there that we can see even the plainest land; and then it looks so much like the black spots in the ice, that when one puts his eye down to the sight-vane of the compass, he is as apt to take the bearing of a black spot as of the land. Besides, we cannot see extreme points from the land. Angling with a sextant from aloft is cold work, and some points show too faintly to get a reflection, so that though I have measured angles several times, I have only recorded them when I have been sure of them.

We were startled this afternoon by an enormous flock of ducks, estimated to be five hundred in number — more than any one had ever seen before — flying quite low, and heading to the northward, where I suppose there must be more land. Our dogs took after them in a body, until stopped by water, and turned back.

The ice seems to be very close again, an easterly breeze setting it in motion enough to press against the islands and close all lanes.

Inspection and divine service as usual on Sundays.

May 30th, Monday. — I have decided to send a party to try to make a landing on Henrietta Island. Tired of waiting for a chance to get observations to determine its position, I accept twelve miles as its probable distance southwest and a half west, true. Though I know the traveling will be heavy, I hope that by sending two officers, four men, fifteen dogs, with a sled and light dingy (for ferriage), and seven days' provisions, as the only heavy weights, they will be able to accomplish my object, — landing, leaving a record of our condition, and perhaps bringing back a good supply of birds. Having but one commissioned officer available, Melville, he must take charge of the party. With Chipp and Danenhower both on the sick-list, they can neither be sent, nor left in charge of the ship if I go myself, as is my strong desire. The doctor cannot go, for his steady sick-list puts him *hors concours*, and my responsibility for the ship and the safety of all hands will not permit me to leave her in charge of Mr. Dunbar, the only sailor man in the cabin besides myself fit for duty. Consequently I make out orders for Mr. Melville to go in command, and to take Mr. Dunbar, Nindemann, Ericksen, Bartlett, and Sharvell with him, and to start to-morrow morning. The weather continues good, with light winds, and barometer rising to 30, and I think we are drawing in toward the island all the time with the ship. Such arrangements as I have made for them and their return I will write out in full to-morrow. To-day I had Sweetman remove the porch from the starboard side of the galley, and I

set the men to work digging a trench around the ship. We are now beginning to be straitened for dog food; all our condemned meats, fish, and other suitable articles are ended. Having tried the dogs upon everything to their seeming satisfaction, we at last tried them with potatoes (desiccated). But here was the dividing line. They turned up their noses and walked away in disgust, and no matter how great their hunger, they cannot be induced to astonish their stomachs with such an excellent (?) anti-scorbutic. In fine, something else had to be done, and so I ordered one half pound English pemmican, and one half pound corn meal to be served out to every dog every second day from the ship's stores; and in order that no more of such precious food than was absolutely necessary should be expended for dogs, I gave orders that three old and worn-out dogs should be quietly removed from the ship and shot. Of course I regret taking even a dog's life, but where it is a question of sentiment only in putting priceless food into a dog, from which no work can ever be obtained, the sentiment cannot be tolerated.

May 31st, Tuesday. — At nine A. M., everything being ready, the sledge party, in charge of Melville, started. Mr. Dunbar, Nindemann, Ericksen, Bartlett, and Sharvell composed the *personnel*, and the following the material: —

15 dogs,	6 sleeping-bags,
42 lbs. American pemmican,	10½ lbs. sardines,
21 lbs. pigs' feet,	42 lbs. mutton-broth,
42 oz. lime juice,	5¼ lbs. coffee,
1 McClintock sled,	2⅝ lbs. tea,
1 McClintock dingy,	5¼ lbs. chocolate,
1 tent,	10½ lbs. sugar,
5 tent-poles,	2 rubber blankets,
210 lbs. English pemmican,	6 packed knapsacks,

42 lbs. bread,	2 rifles,
1 cooking-stove and mess gear,	2 shot-guns,

sextant, artificial horizon, prismatic compass, opera-glass, ensign, medicine, etc.

We all assembled on the ice, and of course cheers were exchanged. Away they went merrily enough until they came to an ice opening, where they were obliged to make a ferriage. Here some of their dogs ran away and returned to the ship, but I sent them back at once, and followed up the sled until they made a new departure. I watched them frequently from the crow's-nest, and at six P. M. I saw them about five miles from the ship, evidently halting for a rest. Of course I sent lime juice, and moreover I started them with eleven gallons fresh water; and besides having Dr. Ambler prepare medical advice and suggestions, I directed Melville frequently to rest his party, to look out for snow-blindness, and to avoid using surface snow and floe ice. Should the distilled water give out during the trip to the island, he was directed to scrape the broken-down crystals from the tops of old hummocks. From the moment of his departure, a large black flag eleven feet six inches square was to be kept flying at the main, and he was frequently to take bearings of it. Should it shut in thick after he had been away forty-eight hours, one of the whale guns or the brass piece will be fired every four hours; and in clear, bright weather, from and after the third noon from his departure, a fire of some material, giving plenty of smoke, will be made at meridian. He is not to remain at the island more than twenty-four hours, and is to do as much as he can in carrying out my written orders.

Of course there is some risk in this trip. But the weather remains good, light northerly winds prevail,

and our drift seems to be directly towards the island. I want to know whether there is any bay in which I can place the ship, and perhaps remedy her leak; whether there is any animal or bird life with which I can replenish our waning stock of provisions; and whether, in the event of disaster, we can fall back upon this island as a place to live, and make a fresh departure for the Siberian coast; whether there is any more land in sight from its summit; and very particularly what is the appearance of the world beyond, whether interminable ice or a chance of water. Should the ice break up around us, I want to know what are the prospects; and so much knowledge can be gained by this visit, as well as the satisfaction of planting our flag upon a newly discovered piece of the earth, that I think the risk of undertaking the journey is justified. During the afternoon, when the weather cleared up, I got good bearings, and I find Jeannette Island on our port bow (S. 11° E. true) and Henrietta Island on our starboard bow (S. 51° W. true), verifying my belief that we are drifting toward the latter island, and heading between the two. My anxiety will be endless and unremitting until I get all hands under my wing again; and I pray God so to aid them and guide us that no mishap may occur.

Soundings in thirty-nine fathoms; slight drift S. S. W., and a low temperature to close our month — 9°. Lauterbach restored to duty from sickness.

June 1st, Wednesday. — What next? The doctor informs me this morning that he is of opinion that several of our party under his treatment are suffering from lead poisoning. Newcomb is quite under the weather with severe colic, and Kuehne is about the same. Alexey is complaining in a similar manner, and

our steward is very ill indeed. The doctor says he is a little disturbed also, and Chipp has had a sharp touch of it. No less than six people, and the sledge party yet to hear from. Suspicion was first directed to the water, for as all joints about the distiller are red leaded to make them tight, we fear that some of the lead was carried over with the steam and deposited in the receiver. This, unfortunately, cannot be entirely avoided, though it may be reduced. Then I examined all vessels in which drinking water is carried or tea and coffee made, and I put out of commission all having any solder patches, substituting iron vessels lined with porcelain. But upon examining our tomatoes, they were found to show traces of lead in larger amounts than the water, and the doctor thinks that the distemper, if I may so call it, is due to our large consumption of that vegetable. The acid of the tomato acts chemically upon the solder used in the tins, and the dangerous mixture is formed; and since we have had tomatoes every day for dinner subsequent to May 4th, it is assumed that we have become largely dosed with lead, and some of us have had to succumb. Inasmuch as we all eat tomatoes, the exemption of the majority is due to their greater capacity for lead, I suppose, for no good reason presents itself to my mind. It has transpired that the steward, who is the worst case, is remarkably fond of this vegetable, and eats of it unsparingly. Of course we have eaten tomatoes four times a week ever since our commissioning, and until May 4th, without any bad result, but that does not prove anything. A very interesting question here comes in. Our canned fruits have, I believe, similar chemical action upon the lead soldering, and no doubt we are absorbing more or less lead all the time. Now does this chemical action

begin at once or at the end of two years? A very important question to an Arctic expedition, for of what use is it to secure exemption from scurvy for two years if disabling lead poison finishes you in the third year? The doctor says each severe attack may be mitigated by medicine, but a continued absorption of the lead will produce palsy, and that would certainly be a perplexing disease to deal with in an Arctic ship. If the chemical action begins as soon as the tomato is canned one is in danger at all times. However, as we stood the vegetable four times a week, I order a return to that issue to see what effect will be produced.

We are certainly drawing in upon Henrietta Island, and getting Jeannette Island well opened on the port bow. Bearings to-day: ship's head S. 10° W. (true); east end Jeannette Island, S. $10^{\circ} 30'$ E.; south end Henrietta Island, S. 51° W.; north end, S. 57° W.; latitude $77^{\circ} 16' 14''$; but I could get no time sight.

During the forenoon our traveling party were sighted from aloft, apparently more than half way to the island.

Dull and gloomy weather; temperature, maximum 15° , minimum 8° , — lovely for a June day. (Strawberries will be late this year in these latitudes.) The ice seems to have slacked up again, a wide opening occurring about twenty yards west of the ship, and extending for a mile north northwest and south southeast.

June 2d, Thursday. — Henrietta Island has been in sight all day and very plainly too, and I am very much deceived if it is more than eight miles distant.

Our lead invalids are responding to treatment, the steward more slowly than the rest, as his attack was the most severe. I have had occasion heretofore to note how naturally one of our two Chinese does the

work of both whenever one is sick, and I am not surprised, therefore, to see the cook calmly cook for all hands and look out for the cabin and ward-room, and wait upon the table; and just now, with extra things like arrow-root, beef-tea, etc., for the sick, and the serving of one sick officer's meals in his room, he has no easy time of it. But it is all done, and Ah Sam nurses Charles Tong Sing meanwhile. My respect and admiration for these two men are boundless. Everything about the ice seems to have come to a stand again. Ice has formed over all openings.

June 3d, Friday. — Nothing yet to be seen of Melville and his party. Taking all things into consideration, I do not expect him before to-morrow night or Sunday morning; but though neither of these times are here yet, I cannot help the constant uneasiness which I experience. Henrietta Island was in plain sight all day, and we are assuredly closing in on it. Bearings of the south end, S. 52° W. (true), and of the north end S. 61° W. (true). I fix our position to-day in latitude $77^{\circ} 13'$ N., longitude $158^{\circ} 12'$ E.; and by the change of bearing since May 24th I fix the south end of the island in latitude 77.8° N., longitude $157^{\circ} 43'$ E., and that makes it eight miles distant. Our drift since May 25th has been S. 74° W. nineteen miles.

We discovered this morning that the ice under the stern was domed up and cracked, and we came to the conclusion that the ship was trying to rise in her bed. To facilitate this operation, and to prevent too much strain being brought on her keel which prolongs under the rudder, the men were set to work digging away the ice. It was a tough job, for it is as hard as flint, and clings like an old and tried friend. Here and there the mark of the fibre of the wood shows in the attached

ice, and in several places the oakum has been torn out of the seams when the ship has been raised a little.

We rig our quarter deck pumps for an hour to-day, and pump the ship out dry, getting up much of the dirty water which has been stagnant all winter, and of late has occasionally greeted our noses. By counting the number of strokes of our pumps and computing the work done, I find that our leak now amounts to 4,874 gallons a day, or about 203 gallons an hour.

The steward has gone back to duty to-day, to our great comfort. He seems quite recovered from his share of lead. Chipp is, however, set back again by an imprudent eating of raisins yesterday. Newcomb is terribly down in the mouth, and looks as woe-begone as possible. He has suffered considerably. Curious that so many of us feel no effects of "Lead in ours" as yet! And we are all on the same diet. I hope none of the traveling party have been afflicted, for assuredly they have enough to do for well men.

June 4th, Saturday. — With one thing and another a lively day. As a fog shut everything in after three P. M., I got our brass gun out and loaded it for a signal to our traveling party should they be within range. Before noon it was fairly clear and pleasant weather, and at eleven A. M. I had a fire made on the ice ahead of the ship, and with tar and oakum we made a good black smoke for an hour. About two P. M. I heard a shot, and going out to see about it I learned that a bear had come up near the ship without being seen by the man on watch (a bright lookout on Dressler's part), and when Starr, who was astern, ran out to get a shot, his aim was so disturbed by his breathlessness that he missed, and away ran Bruin. Chase was given him, of course, and he was fired at; but alas! our 600 pounds of fresh meat escaped.

From Starr's account, he came up and looked at our few remaining dogs, and they looked at him without making a sign. Then Bruin walked to the nearest clothes-pole, deliberately used it to scratch his back and sides against, and then, seeing Starr, commenced to walk away. As he heard the bullet sing he quickened his pace to a run and (why prolong it) escaped. Our tar smoke, no doubt, attracted him. Fired the guns at four P. M. At eight P. M., with a good clearing, we could see nothing of the sledge party.

June 5th, Sunday. — At six A. M., Manson, the man on watch, informed me that the traveling party was in sight. Going out on deck, I could see the silk flag here and there appearing among the hummocks as the sled advanced through the ice. I ordered our colors to be shown, and the men to be turned out to receive the travelers, and then hastening out on the ice tried to fire the whale-gun as a signal to our people that they were seen. After failing once or twice, I left the gun in charge of the men who had come on deck, and came on board. As I reached the mainmast I heard a slight explosion, and, anxious to know whether it was our gun or a shot from the returning party, I was rushing up on the bridge, when crash! I got a terrible blow on the head. Forgetful of the windmill, in my anxiety for the travelers, I had rushed up in time to get a blow from one of its wings flying before a ten-mile wind. Stunned and confused I crawled back, while the blood sprinkled on the ladder and quarter deck, and the quartermaster ran toward me in alarm. Feeling that my head must be cut, I called the steward to get me some water in a basin, and when he came I told him to see what was wrong. He looked at my head, and exclaimed, "Oh my! great big hole!" upon which I con-

cluded I wanted the doctor's opinion, loath as I was to disturb him and add to his already great care and anxiety. When Dr. Ambler came up in the cabin, I learned that I had my head cut open in a four-inch gash, etc. Stitching and plastering followed, and then I resumed my scrutiny of the returning party.

To my relief I could count six people, and all hands seemingly had come to a halt. As soon as possible, I sent out Mr. Cole and the starboard watch to meet them and help them in. At 8.50 A. M. along came the sled, drawn by the dogs and three of the six travelers. Melville and Sharvell had remained with the boat, and Mr. Dunbar was carried part way and walked part way, and reached the ship snow-blind. He was disabled at noon on the third day out, and led or carried thenceforth. Melville sent me the following message, on receipt of which I sent the port watch in Sweetman's charge with a spare sled, and, accompanied by the doctor, I went forward shortly after. By 9.40 A. M. I had them all on board, worn and tired, it is true, but no one disabled but Mr. Dunbar.

Melville's message :—

10.30 A. M. I have just broken the sleigh runner, dismounted my boat, and am in the midst of a heavy jam of ice. Please send another sled at once. Landed on the island 5.10 P. M., third day out.

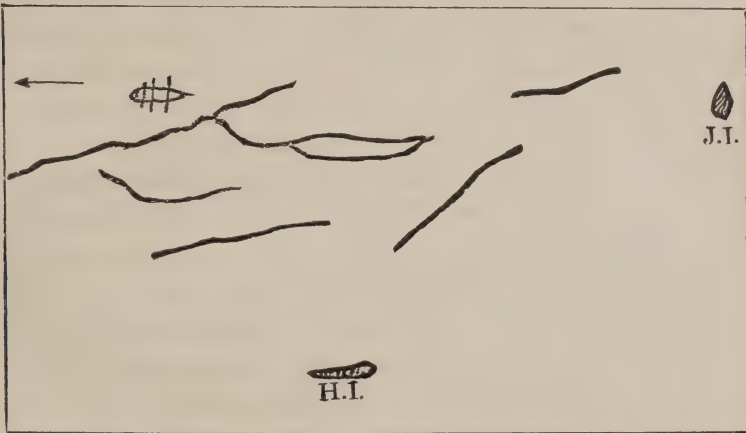
Respectfully,

MELVILLE.

To Lieutenant De Long, Commanding Jeannette.

The party landed on the island on Thursday, June 2d (Friday, June 3d), hoisted our silk flag, took possession of the island in the name of the Great Jehovah and the United States of America, and, agreeably to my orders, named it Henrietta Island. They built a cairn and placed within it the record which I sent with them,

and made as much examination of the island and search for vegetation as their limited stay would permit. The island is a desolate rock, surmounted by a snow-cap, which feeds several discharging glaciers on its east face. Dovekies nesting in the face of the rock are the only signs of game. A little moss, some grass, and a handful of rock were brought back as trophies. The cliffs are inaccessible, because of their steepness. The ice between the ship and the island is something frightful.



Drifting by Jeannette and Henrietta Islands.

Road-digging, ferrying, and its attendant loading and unloading, arm-breaking hauls, and panic-stricken dogs made their journey a terribly severe one. Near the island the ice was all alive, and Melville left his boat and supplies, and carrying only a day's provisions and his instruments, at the risk of his life went through the terrible mass, actually dragging the dogs, which from fear refused to follow their human leaders. If this persistence in landing upon this island, in spite of the superhuman difficulties he encountered, is not reckoned a brave and meritorious action, it will not be from any

failure on my part to make it known. I issued a general order communicating the names and positions of the two islands: Jeannette Island (our discovery of May 16th), in latitude N. $76^{\circ} 47'$, longitude E. $158^{\circ} 56'$; and Henrietta Island (our discovery of May 24th), in latitude N. $77^{\circ} 8'$, longitude E. $157^{\circ} 43'$; and in the evening I ordered a double ration of whiskey served out forward. At ten A. M. I read the Articles of War and inspected the ship, and at 1.30 P. M. I read divine service.

Thank God, we have at least landed upon a newly discovered part of this earth, and a perilous journey has been accomplished without disaster. It was a great risk, but it has resulted in some advantage.

Our sick-list now assumes quite a proportion. Chipp, Danenhower, Newcomb, Dunbar, Alexey, and, in addition, my head for a day or two. For one night, at all events, the doctor insists I shall not go out to the observatory, lest I take cold in the cut and erysipelas ensue; but as soon as I get over the stunned and dazed sensations I have now I think I shall be as fit for work as before.

June 6th, Monday. — While the ocean around us has been alive all day we have remained perfectly calm and undisturbed. This morning we found that such a disruption of the ice-fields had occurred as to leave us on the western side of a floe island, about one hundred yards from its edge, and that the whole of the outside ice was broken up into a terribly confused heap of rolling, tumbling, and grinding floebergs, forcibly reminding us of our experiences of November, 1879. We were evidently in transit across the north face of Henrietta Island, and bound westward ho!

Our ice-island was irregular in shape, with its longer

diameter about a mile in extent, and its shorter diameter about half that amount. Close to us we had plenty of water, but it was in disconnected spots, and we should have been infinitely worse off had we been in one of them. No lead making toward Henrietta Island was to be seen, and in fact the changes going on all over, except in our isolated spot, were so kaleidoscopic that it would have been impossible to detect such a lead if it had existed. Lanes and openings were forming and closing during all the forenoon, and every once in a while the sudden rearing up of some ridge of broken floe pieces, twenty and thirty feet high, showed where a lane had closed, or the sudden tumbling of a mound showed where a lane was opening. In all this confusion worse confounded we remained as quiet as ever. We were moving along slowly and grandly, a dignified figure in the midst of a howling wilderness. Had our floe broken up and hurled us adrift we should have had the liveliest time in our cruise, for to have escaped destruction would have been a miracle, and to have got anything or any person out of the ship in case of accident an impossibility. One can hardly fall back upon yawning chasms for launching boats or depositing provisions.

Over such ice as this Melville charged in for the land on his late journey, and he tells me on one occasion, while aiding Dunbar across a large hummock up-ended, the ice opened beneath them, and the hummock sank until they just escaped touching the water as they sprawled out on the ice.

In anticipation of any accident or mishap I had the steam-cutter hoisted, the kayak and the oumiak brought aboard, and all other things which could not be grasped at a moment's notice.

Soundings in thirty-eight fathoms, muddy bottom. Drift moderate to S. W. ; N. E. to E. winds, nine to twelve miles an hour. Barometer 30.16 to 30.20. Our observation of the rate at which we were drifting was prevented by a dense fog, which hid the island completely after three P. M. Of course I was more or less anxious, not being sure that we were not sweeping down on the island instead of going by it; but as nothing could be done, we were forced to fall back upon our long and too uncomfortably familiar resort, waiting in blindness until we could see.

June 7th, Tuesday.—At ten A. M. the fog cleared away for the first time since five P. M. yesterday, and we saw the island right ahead (S. 80° W. true), and about four miles distant. We were clearly in transit across the north face of the island, and so steadily did we move that it was easy to check our flying-jib stay as it passed slowly from point to point. The confusion worse confounded of yesterday was tranquillized, though many ridges of piled up floe pieces between us and Henrietta Island showed that the fight must have gone on all night, as our fields ground and ploughed their way along. Many of the large water spaces had closed tightly, and the very large one which was on the west side of our ice-island had disappeared. A long ridge of ice-slabs and blocks six and seven feet thick had fenced us in on that side, showing where a meeting had taken place and a crush had occurred, of which we had been quite unconscious, though it was only one hundred and fifty yards distant. Considerable water-sky was visible to the southward and southwest, and several unconnected lanes were to be seen in those directions. The ice having passed the obstruction caused by Henrietta Island had seemingly closed up

again and resumed its accustomed drift N. W. In that direction the ice extended in a limitless field. Soundings in thirty-seven fathoms; moderate drift W.; E. N. E. and E. winds prevailed all day from ten to fourteen miles velocity, and from the general appearance of things I am inclined to think we are going to have a little blow.

I am intensely relieved that our traveling party had no mishap. They started in just the best time and got back none too soon. Sunday morning they were all on board, and Monday we commenced our drift again. Of course, with the fogs and our drifting, had they been absent yesterday the chances of their safety would have been seriously jeopardized. And now where next?

June 8th, Wednesday. — By great good luck got sights for position and determined it to be latitude N. $77^{\circ} 14' 45''$, longitude E. $156^{\circ} 41' 30''$, a drift since the 3d of twenty and a half miles N. 85° W. As we moved so little while the sledge party was away, we have probably made the most of this distance in the past three days. Soundings in thirty-four and a half fathoms, a rapid drift W. S. W. being indicated by the lead line; lowered and hauled the dredge.

A little lane of water remains on what were the north and east sides of our island, but otherwise the ice-field seems as boundless as ever. We are leaving Henrietta Island rapidly to the eastward of us, and before many days it may be lost to view. Inasmuch as we have passed it already, one might call it a thing of the past. (I am afraid that is a poor joke, but since the windmill struck me I can do no better.)

Fresh E. N. E. breezes fifteen to seventeen miles an hour. Barometer 30.11 to 30.14.

I am glad to say that Alexey was this day discharged

from the sick-list, though still kept under slight medical attention.

June 9th, Thursday. — Latitude N. $77^{\circ} 14' 20''$, longitude E. $156^{\circ} 7' 30''$, a drift since yesterday of seven and three quarters miles S. 87° W. Soundings in thirty-eight and a half fathoms. No perceptible drift. Clear, bright, and pleasant weather, E. N. E. breezes fifteen to eleven miles an hour, and barometer 30.13 to 30.25. At eleven P. M. the ship received several severe jars. At 11.30 the old eighty-yard lead, or what was left of it, opened to a width of ten feet, and at midnight such a snapping and cracking took place around us that I concluded we were in for a time, and hastily bundling on my clothes I rushed out.

CHAPTER XII.

LEAVING THE SHIP BEHIND.

11 — 25 *June*, 1881.

The Attack of the Ice on the Ship. — The Break across the Ship. — Orders given to remove Provisions. — The Ship begins to fill. — The Unloading. — The Ship sinks. — The Camp on the Ice. — Preparations for Journey. — Loading of the Sleds. — Arrangement of Camp. — The Sick-List. — Orders for the March. — Deposit of Records. — The Start. — The Difficulties at the Outset. — Terrible Roads. — The Heavy Loads. — Snow and Rain. — The Cracks in the Ice. — Ice Bridges and Ferries. — Fog. — The First Good Day's Work. — The Daily Routine. — Papers brought to Light. — Doubts as to Locality. — Reconnaissance.

[UP to this time Captain De Long had kept his private journal, in addition to the ship's log, and from that journal the narrative has been taken. After abandoning the ship he kept but one journal, and the pages which follow are from that, with the exception of the first entry, which is from the ship's log.]

June 10th, Friday, ship's date (*June 11th, Saturday*, correct date). — At 12.10 A. M. the ice suddenly opened alongside, and the ship righted to an even keel. Called all hands at once, and brought in the few remaining things on the ice. The ship settled down to her proper bearings nearly, the draft being eight feet eleven inches forward, and twelve feet five inches aft. A large block of ice could be seen remaining under her keel. At the first alarm the gate in the water-tight bulkhead forward was closed, but the amount of water coming into

the ship was found to decrease, a small stream trickling aft being all that could be seen.

There being many large spaces of water near us, and the ice having a generally broken up appearance, it was concluded to ship the rudder, to be ready for an emergency awaiting the moving of the ship. After some trouble in removing accumulations of ice around the gudgeons the rudder was shipped, and everything cleared away in the wake of the booms and yards for making sail.

As well as could be judged by looking down through the water under the counters, there was no injury whatever to the after body of the ship. As soon as possible a bow line and quarter line had been got out, and the ship secured temporarily to the ice which remained on her starboard side as nearly in the same berth as she could be placed. By looking down through the water alongside the stem on the port side, one of the bow straps near her forefoot was seen to be sprung off, but otherwise no damage could be detected. It was assumed by me that the heavy ice which all along bore heavily against the stem had held the plank ends open at the garboards, and that as soon as the ship was able to move from the heavy ice the wood ends came together again, closing much of the opening and reducing the leak; the water-line, or rather water-level, being below the berth deck. No difficulty was anticipated in keeping the ship afloat and navigating her to some port, should she ever be liberated from the pack ice of the Arctic Ocean.

Sounded in thirty-three fathoms, bottom mud. Rapid drift W. S. W.

June 11th, Saturday, ship's date (*June 12th, Sunday*, correct date). — At 7.30 A. M. the ice commenced to

move toward the port side, but after advancing a foot or two came to rest. Employed one watch in hauling heavy floe into a small canal on the port bow, to close it up, and receive the greater part of the thrust.

The ice at ten A. M. had advanced toward the port side until these floe pieces had received the thrust, and everything quieted down again. The situation of the ship and her surroundings may be seen below.

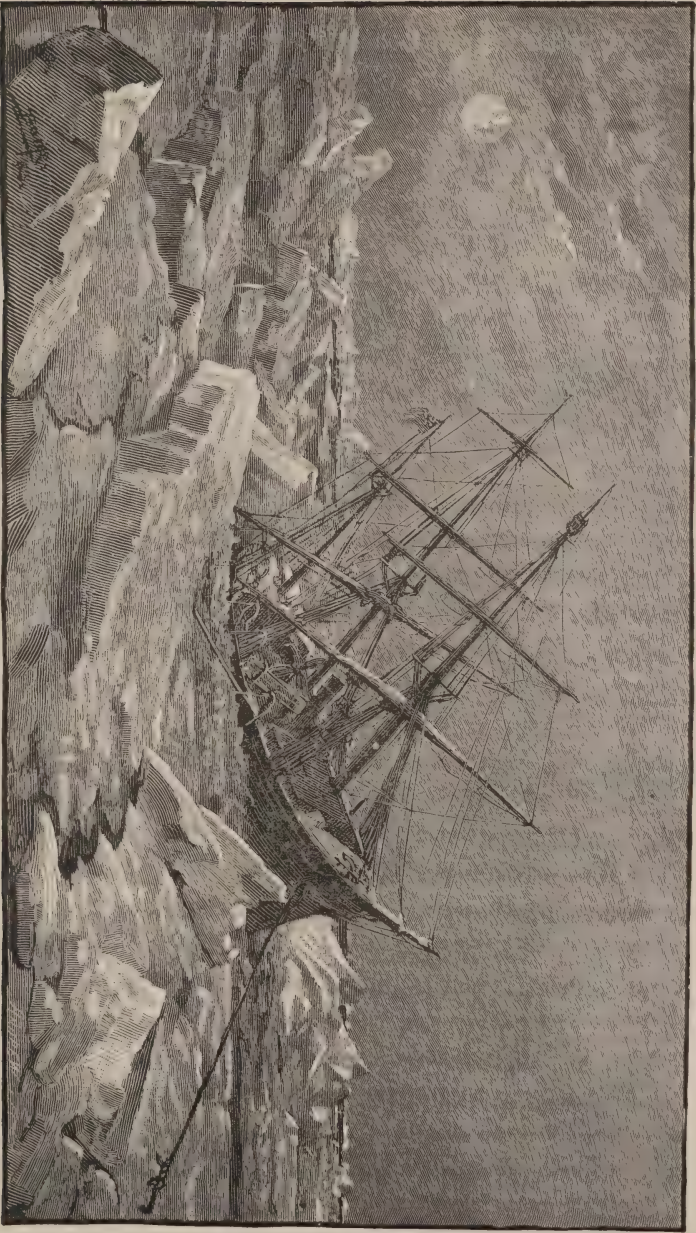
At four P. M. the ice came down in great force all along the port side, jamming the ship hard against the ice on the starboard side of her, and causing her to heel 16° to starboard. From the snapping and cracking of the bunker sides and starting in of the starboard ceiling,



Position of the Ship before the final Crush.

as well as the opening of the seams in the ceiling to the width of one and one fourth inches, it was feared that the ship was about to be seriously endangered, and orders were accordingly given to lower the starboard boats, and haul them away from the ship to a safe position on the icefloe. This was done quietly and without confusion. The ice, in coming in on the port side, also had a movement toward the stern, and this last movement not only raised her port bow, but buried the starboard quarter, and jamming it and the stern against the heavy ice, effectually prevented the ship rising to pressure. Mr. Melville, while below in the engine-room, saw a break across the ship in the wake of the boilers and engines, showing that so solidly were the

stern and starboard quarters held by the ice that the ship was breaking in two from the pressure upward exerted on the port bow of the ship. The starboard side of the ship was also evidently broken in, because water was rising rapidly in the starboard coal bunkers. Orders were now given to land one half of the pemmican in the deck-house, and all the bread which was on deck, and the sleds and dogs were likewise carried to a position of safety. At 4.30 there was a lull in the pressure, and it was assumed for the moment that the ice had united under the ship, and being as close together as it could come would occasion us no further injury, and that we might be able to take care of the ship yet. The ship was heeled 22° to starboard, and was raised forward $4' 6''$, the entire port bow being visible also to a height of $4' 6''$ from the forefoot. (In the early morning we had been able to see through the water down alongside the stem on the starboard side, and we could see that the forefoot was bent to starboard about a foot. This would indicate that the pressure received on the 19th January, 1880, was from port to starboard, instead of the other way, as we then supposed.) But at five P. M. the pressure was renewed and continued with tremendous force, the ship cracking in every part. The spar deck commenced to buckle up, and the starboard side seemed again on the point of coming in. Orders were now given to get out provisions, clothing, bedding, ship's books, and papers, and to remove all sick to a place of safety. While engaged in this work another tremendous pressure was received, and at six P. M. it was found that the ship was beginning to fill. From that time forward every effort was devoted to getting provisions, etc., on the ice, and it was not desisted from until the water



THE SINKING OF THE JEANNETTE.

had risen to the spar deck, the ship being heeled to starboard about 30°. The entire starboard side of the spar deck was submerged, the rail being under water, and the water-line reaching to the hatch-coamings. The starboard side was evidently broken in abreast of the mainmast, and the ship was settling fast. Our ensign had been hoisted at the mizzen, and every preparation made for abandoning, and at eight P. M. everybody was ordered to leave the ship. Assembling on the floe, we dragged all our boats and provisions clear of bad cracks, and prepared to camp down for the night. Took an account of stock and found the following:—

4,950 lbs. pemmican, American,	75 bottles malt extract,
1,120 lbs. hard bread,	$\frac{1}{2}$ barrel lime juice,
260 gals. alcohol,	2,000 rounds Remington am-
100 lbs. cut loaf sugar,	munition,
400 lbs. extra crew sugar,	1 gal. whiskey,
100 lbs. tea,	1 gal. brandy,
94 $\frac{1}{4}$ lbs. mutton soup,	2 gals. whiskey,
176 lbs. mutton broth,	2 gals. whiskey in lime
150 lbs. Liebig's ext. beef,	juice,
252 lbs. canned chicken,	7 bottles brandy,
144 lbs. canned turkey,	First cutter,
36 lbs. green corn,	Second cutter,
12 $\frac{1}{2}$ lbs. pigs' feet,	First whaleboat,
32 lbs. tongue,	Iron dingy,
42 lbs. onions,	McClintock dingy,
18 lbs. pickles,	6 tents,
120 lbs. chocolate,	Sleeping-bags,
36 lbs. cocoa,	33 knapsacks packed,
205 lbs. tobacco,	5 cooking-stoves,
48 lbs. veal,	3 boat sleds,
44 lbs. ham,	4 McClintock sleds,
150 lbs. cheese,	2 St. Michael's sleds,
210 lbs. ground coffee,	2 medicine chests and med-
60 lbs. whole coffee,	icine.

At midnight piped down.

June 12th, Sunday (or Monday, June 13th). — At one A. M. were turned out by the ice opening in the midst of our camp. Transported all our gear and belongings to a place of safety, and again piped down at two A. M., leaving a man on watch. At one A. M. the mizzen mast went by the board, and the ship was so far heeled over that the lower yard-arms were resting on the ice.

At three A. M. the ship had sunk until her smoke-pipe top was nearly awash.

At four A. M. the *Jeannette* went down. First righting to an even keel, she slowly sunk.

The maintop-mast fell by the board to starboard, then the foretop-mast — and finally the mainmast, near the main truss — when she finally sank; the foremast was all that was standing.

At nine called all hands and breakfasted, after which collected all the clothing, arranging it for distribution. Beside the contents of the packed knapsacks, and the clothing in wear, we find we have the following: —

28 over-shirts (woolen),	20 trousers (cloth),
24 drawers,	8 fur blankets,
27 under-shirts (woolen),	18 woolen blankets,
24 sack-coats,	13 skin parkies, —
8 overcoats,	

and they were divided among all hands as required, much of it being in excess.

Latitude $77^{\circ} 14' 57''$ N., longitude $154^{\circ} 58' 45''$ E. Crew engaged in various occupations: getting sleds all ready for boats, changing sleeping-bags. Everybody seems bright and cheerful, with plenty to eat and plenty of clothes. Even music is not forgotten. Lauterbach serenaded us to-night with a mouth harmonica. Set up

a work-tent for my use. Kept silk flag flying. Wind N. E. ; force, from two to three miles. Temperature about 23° all day. All visit wreck. Find one chair on the ice, and some oars and spare planks. Set watch at ten P. M. Chipp better. Danenhower lively. Alexey "plenty good." At 9.45 P. M. read divine service.

June 13th, Monday. — Called all hands at seven A. M. Breakfast at eight. Turned to at nine and set to work mounting first and second cutter and whaleboat on their traveling sleds, and at the same time fitting pads and bumpers for stretching under the bilges of the boats, to prevent injury in case of heavy riding or tumbling off hummocks.

Such of the men as were not thus employed were set to work making bags to hold bread, tea, coffee, and sugar for our traveling rations. I have concluded to remain where we are until all our preparations are well made, and then to start properly.

We have provisions enough to live upon for some time without impairing our sixty days' allowance for going south. Our sick are progressing favorably, and this delay will also tend to their advantage.

Sweetman visited the place where the ship sank, but nothing could be seen but a signal-chest floating bottom up. N. E. wind. Temperature at noon, 28°. Much water-sky in all directions. Air very damp and raw. We all slept very well last night, being both warm and comfortable. Fog and clouds thick.

During the afternoon the boats were mounted on the sleds and got ready for hauling. Between times, we shifted camp further to the westward, as we were too near the edge of the floe in case of accident. Placed Chipp's tent to the rear and to windward, that he might not be kept awake by the "snorers," as was the case last

night. Then moved all our boats to the front of the tents, and the provisions to the front of the boats, and had our supper in our new location.

We carried out of the ship all the drinking water we had on hand, and made it last until Sunday night; but now we are, of course, down to what we can scrape up from the ice. We select the oldest and highest hummocks, and scrape off the broken down crystals when we can find them, but of course the sun has not had power enough yet to do any great amount of melting.

The snow, or rather ice, is *fresh to the taste*, but the doctor, by a nitrate of silver test, finds it much too salty. However, we cannot help ourselves, and must with lime juice, which we take daily, try to avert the danger. Just now we are living royally on good things, and not working very hard, and we are in glorious health, except for some occasional touches of the old lead poisoning suspicion. Temperature at eight P. M. 18° and very damp. Wind N. E. At ten P. M. set the watch and piped down.

June 14th, Tuesday. — Called all hands at seven A. M., breakfasted and turned to by nine A. M.; then set two men from each tent, under Melville's direction, to get together our sixty days' provisions, and to strip off all wooden packages. The doctor, with one man, set to work dividing up (and fortifying) the lime juice among three water-breakers. Dunbar, with two men, overhauled and relashed the three McClintock sledges, to get them ready for stowage and loading. The rest of the men continued the work of making extra foot nips, reducing sleeping-bags, and making such additions to their comfort as were possible. Our sick-list is not progressing favorably. Alexey was very sick all night with stomach-ache, groaning all the time, and vomiting

violently at three A. M. Kuehne is quite sick, and both he and Alexey are laid up in their sleeping-bags. Chipp seems brighter, but as he did not get much sleep during the night he cannot be said to have improved.

Weather clear, bright, and pleasant; wind N. N. E.; temperature at ten A. M. 19° in the shade (minimum during the night 12°). A few cloud-streaks, cirrostratus, to northward. To southward the openings in the ice are shown by light masses of thin, bright fog, sweeping away before the wind. Barometer, 30.37 at 33° , but I am a little suspicious that my pocket barometer is out of order. Latitude by meridian altitude at noon, $77^{\circ} 16'$; temperature, 23° in the shade (running to 30° in the sun). At four P. M. wind not changed, and temperature 24° in the shade. Large masses of fog and soft "steam" are continually rising in all directions and sweeping away before the wind. It would almost seem to indicate a general breaking up of the ice.

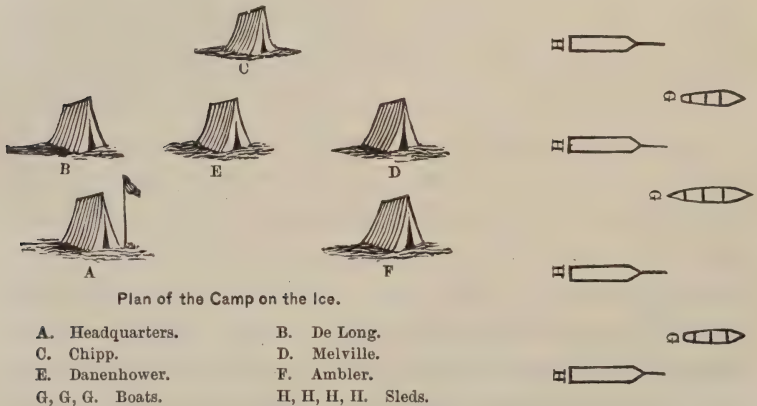
Dinner at one P. M. Turned to at two, and immediately commenced loading up five sleds with provisions. Divided our 3,960 pounds pemmican and 200 gallons alcohol among the sleds, and then, having our weekly ration-bags ready, we switched off to fill them.

The daily allowance of tea is	1 oz.
" " " coffee is	2 oz.
" " " sugar is	2 oz.

To get our weights exactly, we have to start on an ounce weight and the doctor's scales, and work up by a number of Remington cartridges to a pound. Two empty meat tins tied to the end of a stick suspended by its centre made our scale, and we rattled along our weekly rations until supper time (seven P. M.) came.

Sights obtained at six P. M. place us in longitude

153° 58' 45" E., — a drift since the 12th of thirteen and one half miles N. 84° W. Thus far we are getting along very well. Everybody is bright and cheerful, and our camp has a lively look. Its arrangement is as follows: —



After supper no work was done, except putting two rifles apart for each tent (ten in all), which are to be carried in the boats — four in the first cutter, four in the second cutter, and two in the whaleboat.

Wind at eight P. M. light N. N. E. Temperature 17° shade. Piped down at ten P. M.

June 15th, Wednesday. — Called all hands at seven. Breakfasted at eight. Turned to at nine. At eight wind N. E. (mag.). Temperature, 23° shade. Weather dull, gloomy, and foggy, but after ten A. M. it cleared away to a bright, sunny day. The night has been cold, the minimum pin showing 10°. I for one did not sleep well, having found it impossible to keep my shoulders covered by my sleeping-bag, but everybody else seems to be all right and to have slept well.

The sick are as follows: Chipp is better, he says; has slept well, and feels bright. Danenhower goes

around with his game eye darkened, and does a number of things, but of course I can assign him to no regular duty. Alexey has had a bad night, and is quite sick this morning. Kuehne still remains shut up in his tent. During the forenoon we were engaged in bagging as much tea, coffee, and sugar as possible, and in dividing the weights among our five sleds. This was completed by eleven A. M., and we then set to work to lash and secure the loads.

The distribution of weights was as follows:—

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
765 lbs. Pemmican.	720 P.	720 P.	720 P.	720 P.
40 gals. Alcohol.	40 A.	40 A.	40 A.	40 A.
36 lbs. Liebig.	36 L.	—	—	18 L.
61 lbs. C. L. Sugar.	—	—	—	61 S.
60 lbs. X. C. Sugar.	—	—	—	—
4 Bags Bread.	4 B.	4 B.	4 B.	2 B. Br.
30 lbs. G. Coffee.	30 Coffee.	—	30 R. Coff.	—
90 lbs. Tea.	—	—	60 G. Coff.	—
10 lbs. X. C. Sugar.	—	—	—	—
1,659 lbs.	1,318 lbs.	1,252 lbs.	1,342 lbs.	1,325 lbs.

On the ice yet 30 lbs. roast coffee, 30 lbs. ground coffee, 1 bag bread, which must go in the boats.

Still short of sixty days' provisions, viz.: 315 lbs. pemmican, 43 lbs. tea, 55 lbs. sugar, 37 lbs. coffee.

We are, of course, leaving behind us many provisions, and our two dingys, as well as one St. Michael's sled. As our progress will necessarily be slow, I am of the opinion that each encampment for a week after our start will be near enough to our present location to enable us to send back a dog sledge each halt, to bring forward our supplies for the succeeding twenty-four

hours. In this case we shall not break in upon our packed sledges.

Dinner at one P. M., turn to at two P. M., sleds all lashed; and I notice No. 2 (Chipp's) has a sled flag already mounted with the name "Lizzie."

Upon calling Nindemann's attention to our having none, he informed me that one was under way, and that he should like to name it "Sylvie," to which I had naturally no objection. Sights to-day place us in latitude N. $77^{\circ} 17'$, longitude E. $153^{\circ} 42' 30''$. A drift since yesterday of three and three fourths miles N. $70''$ W. Temperature at six P. M. 19° . Wind N. E., force 2.

During the afternoon I issued the following order:—

U. S. CUTTER JEANNETTE.

On the Ice, Lat. $77^{\circ} 17' N.$, Long. $153^{\circ} 42' E.$
Arctic Ocean, June 15, 1881.

ORDER.

When a start is made to drag our sleds to the southward, the clothing allowance for each officer and man will be limited to what he actually wears and the contents of his packed knapsack. Each may dress in skins or not as he pleases at the start, but having made his choice, he must be ready to abide by it. Extra outside clothing of any kind (except moccasins) cannot be taken. The contents of the packed knapsacks are to be as follows:—

2 pairs blanket nips, or duffle nips,	1 skull-cap,
2 pairs stockings,	1 comforter,
1 pair moccasins,	1 pair snow spectacles,
1 cap,	1 plug tobacco,
2 pairs mittens,	1 pipe,
1 undershirt,	20 rounds ammunition,
1 pair drawers,	24 wind matches.
Soap, towels, thread and needles at discretion.	

An extra pair of moccasins (making three pairs in all) with its foot nips may be carried in the sleeping-bag, but nothing else is to be put therein.

Each officer will see that the allowance is not exceeded in any particular.

Sled No. 1. Stores, sleeping-bags, tents, knapsacks, and mess-gear, in first cutter.

Sled No. 2. Ditto, ditto, in second cutter.

Sled No. 3. Ditto, ditto, in whaleboat.

Sled No. 4. Ditto, ditto, in second cutter.

Sled No. 5. Ditto, ditto, in whaleboat.

If at any time we go in the boats, —

Sled crew No. 1 goes in the first cutter.

“ “ “ 2 “ “ “ second cutter.

“ “ “ 3 “ “ “ whaleboat.

“ “ “ 4 “ “ “ first cutter.

Surgeon, Mr. Cole, and cabin steward in whaleboat.

Remainder of No. 5 in second cutter.

Further orders or modifications of the above will be given as necessary.

Very respectfully,

GEORGE W. DE LONG,

Lieut. U. S. Navy, Commanding Arctic Expedition.

An almost cloudless sky, and, in consequence, a broiling hot sun shining down on the floes makes us very uncomfortable. We are all terribly sunburned, and our noses, lips, and cheeks are beginning to get sore. Our eyes are all right yet, however. A few cirro-stratus streaks to southward and southwest, but I do not want the wind from those directions until I can get to the open water.

Supper at seven, lime juice at 8.15, and our customary pipe down at ten.

June 16th, Thursday. — Called all hands at seven, breakfasted at eight, turned to at nine. Engaged during forenoon in making foot nips and making sure our boat accessories were complete.

In anticipation of our sleeping-bags not being warm enough, I ordered each officer and man to take a half blanket also, to be stowed within the sleeping-bag. At 4.30 P. M. I started Mr. Dunbar ahead to the southward to seek and make out a good road, and I then prepared the following order:—

U. S. CUTTER JEANNETTE.

On the Ice, Lat. N. 77° 18', Long. E. 153° 25'.

Arctic Ocean, June 16, 1881.

ORDER.

We shall start to the southward at six P. M. Friday, June 17th (Saturday, June 18th), and our traveling thereafter is to be done between six P. M. and six A. M.,

The order of advance will be as follows:—

1st. All hands drag the first cutter. Dogs drag the No. 1 sled.

2d. Starboard watch drag the second cutter. Port watch drag the No. 4 sled. Dogs drag the No. 2 sled.

3d. Port watch drag the whaleboat. Starboard watch drag the No. 3 sled. Dogs drag the No. 5 sled.

Alexey's three dogs will drag the St. Michael's sled. Kuehne, Charles Tong Sing, and Alexey, to report to and accompany Lieutenant Chipp.

The daily routine will be as follows:—

Call all hands	4.30 P. M.
Breakfast	5.00 “
Break camp	5.40 “
Under way	6.00 “
Halt	11.30 “
Dinner	Midnight.
Pack up	12.40 A. M.
Under way	1.00 “
Halt, pitch camp	6.00 “
Lime juice	6.00 “
Supper	6.30 “
Set watch, pipe down, turn in	7.00 “

Course S. by E. one half E. (magnetic).

Before lighting any alcohol lamp, the stove is to be placed in a hole in the snow to prevent loss of heat, and a passage way cut to supply air for the flames. The cooks will be changed every Saturday. They are to get meals as rapidly as possible after each halt, going at once to St. Michael's sled for alcohol, and to be sure that the alcohol tin is tightly closed up before returning it. Particular care must be taken in getting ice and snow for cooking. The tops of the highest hummocks only must be used, and scraping is not to go more than an inch below the surface. It will be the duty of the man whose next turn comes to cook to collect the snow or ice, and assist the cook of the week.

The work of unloading and reloading will be done by the remainder of each sled crew. As long as it is possible to do so, the St. Michael's sled will be sent back each morning to bring up provisions now in this camp, in order that we may not have to break in upon our sled stores. But when we do commence upon our loaded provisions the following will be the ration table:—

BREAKFAST.	DINNER.	SUPPER.
4 oz. pemmican,	8 oz. pemmican,	4 oz. pemmican,
1 oz. ham,	1 oz. Liebig,	1 oz. tongue,
3 pieces bread,	$\frac{1}{2}$ oz. tea,	$\frac{1}{2}$ oz. tea,
2 oz. coffee,	$\frac{2}{3}$ oz. sugar.	$\frac{2}{3}$ oz. sugar,
$\frac{2}{3}$ oz. sugar.		1 oz. lime juice,
		$\frac{1}{4}$ lb. bread.

GEO. W. DE LONG,

Lieut. U. S. Navy, Commanding Arctic Expedition.

During the afternoon the sleds and boats were each supplied with their flags.

The first cutter Jeannette carries my silk flag.

The second cutter Hiram carries flag Hiram.

The whaleboat Rosey carries flag Rosey.

No. 1 sled carries square blue flag Sylvie. Motto, *Nil desperandum.*

No. 2 sled carries swallow-tail flag Lizzie.

No. 3 sled carries flag.

No. 4 sled carries white flag, red Maltese Cross. Motto, *In hoc signo vinces.*

No. 5 sled carries flag Maud. Motto, *Comme je trouve.*

At eight took our lime juice. Then called all hands to muster and read the foregoing order, after which we hauled up the light dingy and left her alongside the iron dingy. We are now, I believe, all ready, and will start at six P. M. to-morrow. Loaded the St. Michael's sled with twenty gallons lime juice in two ten-gallon breakers, ten gallons alcohol in whiskey keg, instrument box, medicine box, two demijohns whiskey, five rubber bottles lime juice, surgical case, Winchester rifle, and twelve cartridges in its magazine, box chronometer Negus No. 1630.

Latitude N. $77^{\circ} 18'$, longitude E. $153^{\circ} 25'$; temperature 20° . Division of officers into watches:—

STARBOARD WATCH.

De Long,
Danenhower,
Ambler,
Collins.

PORT WATCH.

Chipp,
Melville,
Dunbar,
Newcomb.

June 17th, Friday. — Called all hands at seven. Breakfasted at eight. Turned to at nine. Loaded up our second St. Michael's sled with provisions and started it ahead to our furthest guide-flag. Tightened up lashings of all sleds, and put in soft wedges of wood between alcohol tins. Prepared one of our records to leave in a water-breaker closed up, in case it is ever picked up. (The dates are correct dates for our longitude.)

U. S. CUTTER JEANNETTE.

On the Ice, Lat. N. $77^{\circ} 18'$, Long. E. $153^{\circ} 25'$.

17th June, 1881.

We break camp and start to the southward over the ice to-morrow evening, Saturday, June 18th, hoping with God's blessing to reach the New Siberian Islands, and from there make our way by boats to the coast of Siberia. The Jeannette was beset in the pack ice of the Arctic Ocean on the 5th day of September, 1879, about twenty-five miles east of Herald Island, and between that date and the 12th day of June, 1881, was drifted to the northwest, reaching, finally, latitude N. $77^{\circ} 15'$ and longitude E. $155^{\circ} 0'$. On the last named date she was crushed by a coming together of heavy floes after a slight opening in the ice, and sunk at four A. M., June 13th. We had abandoned her and camped on the ice at eight P. M., June 12th, having saved about eighty days' provisions, five boats, all tents, and other traveling gear, and more than enough clothing, arms, and ammunition. Our party consists of the following named persons, no death having occurred since our leaving the United States [here comes a list of all hands], and are all in fairly good health, no scurvy having made its appearance in our midst. I say fairly good health, because there are two officers (Lieutenant Chipp and Master Danenhower) and three men (Alexey, Tong Sing, and Kuehne) under the surgeon's charge for various debilitating causes. We have discovered and named two islands, landing upon the second one a party in charge of Mr. Melville; May 21, 1881, Jeannette Island, in latitude N. $76^{\circ} 47'$, and longitude E. $158^{\circ} 56'$; and May 25, 1881, Henrietta Island, in latitude N. $77^{\circ} 8'$, longitude E. $157^{\circ} 45'$. Excepting these islands we have seen nothing but ice since losing sight of Herald Island in March, 1880. The ice in this ocean is of the same character as that encountered north of Smith's Sound by Captain Nares, and as the prevailing winds are from the southeast this ancient ice moves slowly along to the northwest. There are no currents which are not caused by the wind prevailing at the time. Our lowest temperature in winter of 1879-80 was minus 56° Fahr., and in winter of 1880-81 mi-

nus 50°. Our highest temperature in summer 1880 was plus 46°, and thus far our highest has been plus 30°.

This month seems to be a cold one, — plus 20° to plus 25°, — and I am inclined to think this will be a cold summer. There has never been a time that we could move a ship's length since our first besetment.

We have remained in camp since the loss of our ship in order to pack our sledges, make all our arrangements for proper traveling, and recruit our sick. We start with sixty days' provisions, and besides ourselves we have twenty-three dogs.

GEO. W. DE LONG,

Lieut. U. S. N., Commanding American Arctic Expedition.

This I had carefully sewed in a piece of black rubber, and placed it in an empty boat-breaker, which left on the ice may get somewhere.

Dinner at noon. At one P. M. piped down, — all hands lying down to get some sleep before starting.

At five P. M. called all hands again, and as soon as possible had supper, or, as it ought to be called now, breakfast. Broke camp at 5.50 P. M., and though six was the time for starting it was 6.20 P. M. before we got under way. All hands started with the first cutter, while the dogs, managed by Aneguin, attempted the No. 1 sled. The cutter went easily enough, but No. 1 sled was more than a match for our dogs. Occasionally stopping, we lent a hand to start the sled from a deep rut, and, finally, seeing the necessity of more force, I detached six men from the cutter and went back with them to help the No. 1 sled, and to this the origin of our day's trouble may be referred. When I sent Mr. Dunbar ahead yesterday it was to plant flags for our first day's journey, and upon his return I could see but three flags, and supposed there were no more. Melville accordingly dumped the provisions at this third

flag, as the end of our day's journey. Upon the cutter reaching the third flag Melville wanted to stop, but Dunbar informed him there was a fourth flag, and that *that* was the end of the first day's journey. Of course I could not be everywhere in a road one and a half miles long; and Melville, in his uncertainty about my wishes, had to be guided by Dunbar's idea, so that the first cutter, instead of halting by our provisions, was carried on beyond them, to my extreme annoyance when I learned of it.

Meanwhile the six men and myself went back to the No. 1 sled, and by almost superhuman exertions got it along a quarter of a mile, and then seeing Chipp and the hospital sled hanging behind waiting for it, I sent him ahead with the invalids to go after the first cutter. The six men and myself then got the second cutter and whaleboat along to where we had left No. 1 sled, and while wondering what kept Melville and the men away so long (they should have been back long since), I saw that Chipp had come to a stand-still. Hastening toward him I found that the ice had opened, and that our remaining effects would have to be unloaded and ferried over.

Here was a nice fix. Sending back at once for the light dingy, I got Chipp and the hospital sled over, and sent him on to hurry the cutter party back. Time was slipping away, and all that the six men and myself could do, with the assistance of the dogs, was to get the second cutter and whaleboat, with No. 1 and No. 2 sleds, as far along as the ferry.

By ten P. M. the first cutter party returned, and we at once launched the two remaining boats, hauled across and got them upon the ice on the other side. To avoid unloading the sleds, a road was sought and found higher

up, when, by filling in with some large pieces of ice, we managed to get an uncertain way of crossing the opening lead. While so crossing we doubled under the right runner of No. 1 sled, and had to stop lest we should ruin it. No. 2 and No. 5 each broke a runner, the tenons of the upright breaking short off. And in fine, by the time we had crossed this lead, Saturday, June 18th, 12.10 A. M., we had three disabled sleds, were already an hour late for our dinner, had our provisions half a mile further on, and the mess gear and sleeping gear of No. 1 sled a half mile further still. However, there was no help for it. So, buckling to our two boats we started on, and by 1.30 A. M. had reached the black flag and our provisions. Here I ordered a halt and dinner cooked. On the way back from the first cutter the doctor had encountered Chipp and the invalids hobbling along pretty well exhausted, and after administering a dose of whiskey to Chipp had recommended him to stop at the third flag, where the provisions were. But to make our confusion more complete he had not done so, but had continued on to the first cutter. Hence I had to move all hands on to him or bring him back to us. Deciding the latter to be most feasible I sent Ericksen ahead with a dog sledge to bring No. 1's mess gear back, and with orders for the invalids to come back riding upon the dog sled, if they could not walk. (During the advance with the first cutter Lauterbach had doubled up with cramps, and was left where the cutter stopped in Newcomb's charge. Lee frequently was falling down also suffering with cramps, for which we can assign no cause except lead poison.) Well, I got all hands together by two A. M. and at dinner, except No. 1 sled, which did not get dinner until three A. M.

As soon as two, three, four, and five sled crews finished dinner, I sent Starr, Bartlett, and some dogs with St. Michael's sled back to our old camp to bring forward provisions; and Mr. Cole, with the remainder of our dogs ahead, to bring back hospital sled. And when No. 1 finished dinner I took all remaining hands and went back to the ferry, unloaded entirely our broken sleds, and from the two sound ones removed everything but pemmican and alcohol; and then, eight of us to each sled, we dragged them up to our camp, reaching it by six P. M. Cole, meanwhile, had arrived with the hospital sled, and Ericksen took his dogs and went forward for No. 1's tent and sleeping gear. At seven we had supper, and at eight A. M. set the watch, and piped down, a weary lot of mortals. Weather all day overcast.

Temperature at eight P. M. 21°. Wind northeast. Weather overcast, and very raw and damp. The fog seems to penetrate to the bone. All hands seem bright and cheerful. None of us are stiff after our hard work, strange to say, and have slept splendidly. The sick are as follows: Chipp used up about the legs; has slept some, but only in the early part of the day. Alexey, better; steward, better; Kuehne, better.

Got up the first two sled loads, and one broken sled, by 9.30 P. M., and immediately sent off the relief party for two more sled loads. Sent Mr. Dunbar ahead to the southward again to make out a road, and our first party set to work repairing our sleds. Found to my unpleasant surprise that the whaleboat's sled was broken in the after cross-pieces; dismantled the boat and set about repairs.

Our experience thus far in traveling has not been very encouraging. We have had such terrific roads, such soft and deep snow, and such ugly ice openings,

that our difficulties have been increased. The necessities of the case have led to overloading the sleds, and though they would have gone well enough on smooth ice, the snow would stop these or any other sleds — twenty-eight men and twenty-three dogs laying back with all their strength could only start our sixteen hundred pound sled a few feet each time; and when sliding down a hill it would plunge into a snow-bank, it was terrible work getting it out. Though the temperature was between 20° and 25° we were in our shirt-sleeves, and perspiring as on a hot summer day. I see very clearly that we must run with lighter loads, and go over the same ground oftener. I hoped to be able to advance our boats and provisions in three separate hauls, but I must be satisfied if we now do it in six.

By midnight we had got up all our sled loads left at the ferry, and sat down to our dinner.

June 19th, Sunday. — At one A. M. turned the hands to and resumed work on the sleds. I started back the St. Michael's sleds and dogs, with Starr in charge, to our old camp to bring forward the remainder of our provisions.

Loaded up Melville's sled with his pemmican and alcohol only: 720 lbs. pemmican, 320 lbs. alcohol, — 1,040 lbs. instead of 1,342 lbs., as before.

Finding that the second cutter's sled was beginning to spread, dismounted the boat and set to work tightening the lashings. After having tightened the lashings of No. 1 sled, packed upon it seventeen cans pemmican, 765 lbs.; eight cans alcohol, 320 lbs.; one bag tea, one bag coffee, one bag sugar, one half bag sugar, one half bag tea, thirty-six lbs. Liebig. And upon the doctor's No. 5 sled, all the bread except one large bag. Upon Danenhower's and Chipp's sled packed only their

pemmican and alcohol. At six A. M. had supper; at 7.30 A. M. had lime juice; at 7.40 A. M. had prayers; and at eight A. M. piped down.

At eight P. M. started ahead the second cutter, No. 1 sled, and hospital sled, while Starr and Ericksen ran ahead a St. Michael's sled, with provisions. All, this time, to stop at first cutter, No. 3 sled crew finishing lashing on the whaleboat while I remained in the rear to hurry things forward.

I have changed our procedure to the following: Chipp, Danenhower, and the other sick go along with the medical sled under the doctor's charge, and reaching our halting place, stop there. Melville, with the men, conduct the boats and sleds to the front, and I load and dispatch dog sleds and bring up the rear. This programme would have worked very well had not the ice opened after Melville got the second cutter and No. 1 sled to our new camp; and, consequently, when I, to relieve Ericksen, ran forward with the two dog sleds, we had a hard time in getting across the opened place. However, we got across and to the camp at noon, and I ordered dinner to be prepared for twenty-six, while I took back enough for the remaining seven, myself included, intending to eat it at our old camp. To my surprise, however, I met Melville half way with the whaleboat, which disarranged my plans somewhat. I called a halt, sent Melville with his men on to their dinner, ordered dinner to be prepared for my party of seven at the whaleboat, and going back to the old camp brought up to the whaleboat a load of provisions. This brought us to one A. M.

June 20th, Monday. — As soon as dinner was ready at the whaleboat we sat down to it, having the unprecedented luxury of a board for a table. Just at one I

heard Melville arrive at the camp, the last yo-heave-yup of Nindemann announcing that fact. At two A. M. we turned to and went back for the sled load of bread, while Ericksen went on to the camp. When we got as far as a crossing place beyond the whaleboat, though there was a smooth road and no provocation, our McClintock sled broke down, to my unmitigated disgust, one runner doubling under completely. We unloaded the bread and hitched on to the whaleboat, but could only get her as far as the crossing place. Here Melville and his party hove in sight, and they took the boat away in good style, leaving me to guard the bread. Soon Ericksen came along with his empty sled, and upon his return trip with a load, I sent the broken McClintock sled to the carpenter's hands. When Melville got into camp he went to work pitching tents by my order, and Wilson unloaded No. 3 sled and brought it back with the dogs to me. We then loaded one half of the bread, and by some filling in where the ice had opened we got it safely home. Bartlett then went back for the remainder, and got it up by five A. M. Ericksen by this time had made one more trip, and I now relieved him and Leach, sending back Boyd and Johnson for one more load before supper. Having left some leaking tins of alcohol in our old camp, I sent back an empty boat-breaker to be filled from them.

Supper at six A. M. Mr. Collins was added to our list of ineffectuals to-day with "a stitch in his breast," but seems all right again at supper. Last night we were somewhat inconvenienced in our tent by a wet lower blanket, and my sleeping-bag got wet. The snow and ice thaw from the heat we generate, and flow over our rubber blanket. With the snowy weather we have no chance to dry it, and have to take it as it is. Lime

juice 7.30 A. M. Pipe down eight A. M. at first cutter's camp, only one and one half miles from our first starting place of Friday, the 17th.

Called all hands at six P. M. Breakfasted at seven P. M. It has been *raining* steadily for the last eight hours, and I find the temperature up to 35°, and the wind still from N. E. Not caring to expose anybody to the weather, I sent around word that we should not start until the rain let up; and during the remainder of this day we sat around in our tents wet and uncomfortable, hoping for a change, and wishing for a little sun to dry our sleeping-bags.

At no time of the year is traveling worse than at present. In the winter or spring months it is, of course, cold and comfortless, but it is nevertheless dry. In autumn or late summer it is favorable, because the melted snow has all drained off the hard ice, and the traveling is excellent. But just now the snow is soft enough to sink into, and progress is almost impossible. And when a rainy day sets in, one's misery is complete. Even the dogs cower under the boats for shelter like hens, or snuggle up against the tent doors begging for admission. One comfort we have is, that this rain will melt and pack the ice, and, should a cold snap follow, freezing will make a good road.

On shore the pattering of the rain on the roof has a pleasant sound to those within, but out here it is far from pleasant. No fires, of course, except for cooking, and no place to dry clothes, and little streams of water, trickling down on you from the tent ventilating holes, make your own wetness more wet.

These halts and long camps have shown me that several of our party have been carrying more than I can permit. It is astonishing how many "little things that

don't weigh anything" have crept in, and it is equally surprising how great is their aggregate weight. I shall have one more clearing out before leaving this camp.

Dinner at midnight carries us into

June 21st, Tuesday. — Day opens with N. E. wind, a steady rain-fall, and a temperature of 35°. My pocket barometer has got down to 30.22", but I still think it out of order. At 2.30 A. M. the rain ceased, and we resumed the work of repairing our St. Michael's sleds. Having finished repairs to the doctor's light McClintock sled, I sent it back with Boyd, Iversen, and Aneguin, to bring up a load of provisions from the last camp, which was accomplished by five A. M. Sent Mr. Dunbar ahead with four men to make a road where necessary, and to place flags. At 3.30 A. M. I took a narta¹ and nine dogs, and with Kaack carried forward 450 pounds pemmican and 50 pounds Liebig extract.

Mr. Dunbar had cut two roads, — one through piled up hummocks, and another through a broken ridge, — but generally speaking our day's work to-morrow will be easier than any of the preceding days. There is one ugly place where the ice has cracked and opened to a foot in width, and if it opens further, requiring bridging or ferrying, we shall again have our hands full. Though the rain has ceased, the sky remains overcast and threatens more moisture. The temperature remains at 35°. Wind E. N. E.

Supper at six. Pipe down at eight A. M. Called all hands at six P. M. Breakfasted at seven, and at 7.50 P. M. got under way. Sent Melville ahead with Nos. 1 and 2 sleds and two dog sleds (one narta, and one No. 5), and Ericksen and Leach with the other narta to the old camp to bring forward remainder of stores. Left

¹ A sled. — Ed.

the camp pitched, and sleeping gear and mess gear convenient to the boats, in the event of our having to dine here. The doctor with the sick remained, of course, with the tents.

By 8.30 P. M. Melville and his party and the two advanced dog sleds have come back to camp, having left the first load at the crack in the ice mentioned this morning, it having widened as I feared during our sleep. By nine the second installment was sent along, and by 9.30 the camp was broken, and the whaleboat, with two more dog loads, under way.

Mr. Dunbar and two men remained ahead to try to get a large piece of ice down to bridge the opening. I had instructed Melville, in case Dunbar had managed to bridge the opening, to get all our traps through the gap, and as he did not return for the first cutter, I concluded this was being done. At 11.30 P. M. Leach and Erickson arrived from our old camp with the dog sled and half the remaining provisions, the balance being left with the dingy some distance back. As I was anxious to get forward to see the state of things ahead, I sent Erickson and Leach back with three dogs for the dingy, and placing No. 1's mess gear in the dog sled, I started on with three more dogs. This brought us to —

June 22d, Wednesday. — I hardly had gone one fourth mile when I came to an ice opening, and in spite of my strongest efforts, the dogs scattered across some lumps, capsized the sled, dragged me in, and sent all my mess gear flying, having accomplished which, and reached the other side themselves, they sat down and howled to their hearts' content.

Floundering across, I managed to collect my scattered property and get it safely over, and then righted and dragged out the sled. As soon as resistance was re-

moved, away went my dogs again. Reaching the ice opening which had occasioned the delay at one A. M., I found Melville afloat and adrift on an ice-island with all boats and sleds, nothing having been got through the gap. I shouted to him to start dinner, and I would join him later when the dingy came up. But he managed to get a cake of ice dragged to me, and I ferried across with my dog team and mess gear. At once we set to work getting floes in place as bridges, and before sitting down to dinner we had two sleds and a lot of dog loads through the gap on to the heavy ice beyond. At 1.30 sat down to dinner, and at two Ericksen and Leach arrived with the dingy. At 2.20 A. M. turned to and ran the whaleboat and second cutter through the gap. Then sending Melville back with the party for the first cutter, Ericksen, Leach, and myself pushed on two dog teams with pemmican and bread as far as the flag which I left a load at yesterday. When we got back to the gap the doctor and the sick were adrift, the ice having opened out during our absence. Dragged cakes of ice down, and made a crazy bridge over which the sick walked, and then we got the medical sled across, and after bridging, dragging, digging, and filling in, by six A. M. we had everything, first cutter included, through the gap and on the hard ice.

Melville had to launch the first cutter and paddle her part of his way, but he got her up in time to take a share in the work of the rear-guard.

At 7.30 A. M. we had supper, and a more tired and hungry set of mortals could not be found.

And so we got ready to bag, having come along about a half a mile in ten hours' hard work. At nine A. M. piped down.

At six P. M. called all hands. Breakfasted at seven.

Lime juice at 7.30, and at eight started off Melville and Nos. 1 and 3 sleds, while Ericksen and Leach took on two dog sled loads.

Weather a trifle pleasanter. Much fog prevails, through which the sun glimmers and blinks like a drunkard's eye.

Sick, so so. Chipp has had a bad night, and is much the worse for wear this morning. Alexey is so easily upset by a little stomach-ache as to lose his grip altogether. Lauterbach looks as if he were going to attend a funeral any moment, and must keep his countenance to the proper point of solemnity. Danenhower's trouble is, of course, his blindness. Mr. Dunbar begins to wear again, and I have cautioned him to be careful of himself for a few days, and not to exhaust all his strength.

By 8.45 Melville had returned from a little distance ahead, having broken a McClintock sled, or rather disabled it; for we at once set to work to right the turned runner, and strengthen it with an oar lashed along the inside. No time was lost in sending along one more sled load, and at 9.15 Ericksen and Leach had started with another invoice drawn by dogs.

On this second trip unfortunately a runner of a McClintock sled doubled under, and had to be brought back for repairs. I kept Nindemann and Sweetman to do this, and sent on the boats and continued the trips of the dog sleds. At 10.30 I sent on the doctor with the sick, and at 11.30 everything else having gone ahead, Nindemann, Sweetman, Aneguin, and myself, with some dogs, dragged along the dingy and a few cans of provisions, and reached the halting place by 11.55 P. M.

For the first time in our experience we were able to

reach in one half day the indicated place, have dinner on time, and get ready for a new start after dinner. This was because we were on solid ice, and had no openings.

June 23d, Thursday. — Sat down to dinner at 12.15 A. M., and turned to at 1.15. The weather remained foggy, and we had a perfect calm. Running ahead a dog team I found we could get on about a mile further before being stopped by rough ice, and the word was given for a general advance. By four A. M. everything was forward. Meanwhile, seeing a good-looking lead Mr. Dunbar and I got in the dingy and followed it up, but it turned soon to the northwest, and I gave up the idea of taking to the water. Just where we are it seems impossible to proceed without the occurrence of an opening. A small opening alongside of our track terminates at our camp, unfortunately, as it tended in a southerly direction. We made use of it to float our boats down for an eighth of a mile.

At 2.30 the sky cleared, and the sun came out brightly. A few cirrus clouds were all that could be seen, the fog rolling away as if by magic before a light N. E. breeze. At five A. M. the temperature was $25\frac{1}{2}^{\circ}$, and at seven A. M. $26\frac{1}{2}^{\circ}$, and our camp being pitched we prepared to bag, having supper at six A. M. This is the first really good day's work, and yet I do not think we have made good more than one and a half miles, though working seven hours steadily.

To the southward of us the ice is terribly confused, and presents no chance for an advance as yet. But no one can tell what six hours may bring forth, and when we get up again we may see something. I attempted to get our position by a Sumner, but the change of bearing of the sun in the two hours gave me

hardly angle enough for a good intersection. The longitude is about E. 152°.

At 8.30 A. M. piped down. At six P. M. called all hands. Breakfasted at seven. Sent Mr. Dunbar ahead through the most likely looking part of the rough ice in front of us to try to find a road. At eight started ahead on our day's work, and, to save unnecessary detailed description, I will here mention once for all our manner of procedure.

The daily routine and manner of progress marked out on the 16th have had to be abandoned for several reasons, the principal of which was the impossibility of telling one minute how the ice would be the next in disarranging plans; and second in importance, because men *cannot* do this kind of work ten and a half hours each day without breaking down. By and by, perhaps, when our loads are lighter, we may be able to do it, but just now it is out of the question. Our route having been indicated by several black flags placed after a halt, or before a start, Mr. Dunbar goes ahead at eight P. M. to make sure that no bridges have become necessary in the mean time. Then right after him goes Melville, with nearly all hands, dragging the heavy sleds. No. 1 (already christened the Walrus) requires all his force, but generally he can start two of the others at one time. Ericksen and Leach run two dog sleds, trip after trip, all day; while I load, and occasionally run one myself ahead, to mark progress and indicate the route. The loaded sleds being up, Melville's party comes back for the boats. I then start the doctor ahead with the sick, to go as far as the heavy sleds have been dragged. I then get the medical sled and run a load up to the same place. By this time the boats are up, and eleven P. M. has arrived, and I break off the cooks to get din-

ner, while Melville and his party drag the sleds ahead another stage. Then there is midnight, and —

June 24th, Friday — Dinner succeeds. At one we turn to, drag the boats to where we left the sleds; then along goes the doctor and the sick to that place; then ahead go the sleds again; again the boats, always the dog-sleds, and finally at 5.30 or six I bring up the rear-guard. We prepare for supper, pitch camp, and the dog-sleds get up with the last load. At seven we sup, at eight pipe down, to be called at six P. M.

We therefore haul nine hours a day, sleep or rest ten, meal hours three, and the other two hours are occupied in pitching camp, serving out and cooking food, breaking camp, and marking road ahead. There is no work in the world harder than this sledging; and with my two line officers constantly on the sick-list, I have much on my hands. In Melville I have a strong support, as well as a substitute for them, and as long as he remains as he is — strong and well — I shall get along all right. The doctor is willing and anxious to pitch in and haul like a seaman, but I consider him more necessary to the sick, and have directed him to remain with and accompany them.

To-day we have done very well, having made one and a fourth miles (estimated), good. The ice opened on us twice, and gave me and the dog-sleds some trouble. The heavy sleds had gone on before the ice opened. One dog sled got half overboard, and we had to cut the dogs adrift to save them from being drowned, while two of us held the sled back. The prospect for our next start is encouraging. We are now on a piece of old ice which seems to extend for several miles yet. To-day has been unusually disagreeable on account of the amount of water on the surface of the ice. Frequently

the men broke through over their knees, and dragging, under these circumstances, is hard work. In pools here and there around us water has formed, and though the lower temperature freezes it at night, the sun thaws the ice in the middle of the day, and we suddenly flounder in. A month later this water will drain off to the sea. The weather was foggy at our start last night, but though the fog disappeared soon after, the sky was covered with cirro-cumulus and cumulo-stratus clouds, effectively blocking my attempt to get the latitude at midnight, consequently we are still in the dark as to our position.

Chipp is very weak, and just strong enough to be able to walk from place to place by easy stages. I am very seriously disturbed about him. Lauterbach was restored to duty yesterday evening. Alexey still sick, unable to keep anything on his stomach.

Starr informs me that he has often come across written papers in our provision packages, and he has brought me this one which he found yesterday with some coffee: —

“ This is to express my best wishes for your furtherance and success in your great undertaking. Hoping when you peruse these lines you will be thinking of the comfortable homes you left behind you for the purpose of aiding science. If you can make it convenient drop me a line. My address,

“ G. J. K.

“ 10 *Box, New York City.*”

At the doctor's suggestion I to-day issued an order that all salt now in our possession should be saved, and none used until further orders. Each boat box has two tin canisters containing two pounds each, and that gives us twelve pounds altogether.

We used the last of our chicken and turnips to-day,

and now we come down to our traveling rations, nearly. Chocolate, cocoa, and cheese we still have, in addition, and so long as carrying them does not stop our way we shall take them with us.

Piped down at 8.30 A. M.; called all hands at six P. M. Weather foggy. At seven breakfasted; at eight started ahead sleds, — Dunbar and I going ahead to mark out a road. Much water under the surface crust; broke in frequently to our knees. Placed two flags half a mile south of this camp, and sent doctor and sick ahead to this spot at 9.30. We did not succeed in getting all our gear up last march, and have to send back for six sled loads. By midnight everything was so well along that —

June 25th, Saturday, found us getting ready for dinner, to which we sat down at one A. M., turning the hands to at two A. M. At midnight I had got a meridian altitude, which to my amazement gave me a latitude of N. $77^{\circ} 46'$. There was no mistake in the observation, and I went over my figures a half dozen times to find any error. But each time $77^{\circ} 46'$ was the result. I overhauled my sextant, but that was all right, and my amazement increased. To start in $77^{\circ} 18' N.$, travel south a week, and then find one's self twenty-eight miles further north than the starting point is enough to make one thoughtful and anxious. For a long time I pondered, and for the moment was inclined to attribute the strange result to some extraordinary refraction, but upon looking back at my rejected Sumner of the 23d I found that the intersection gave $77^{\circ} 46'$, and so was more anxious than ever. At 4.30 A. M. and 7.30 A. M. I got another Sumner, and this, plotted, gave me $77^{\circ} 43'$ for a latitude. My rough means of making a skeleton chart accounted in part for the difference from the

lower meridian altitude. More anxious than ever, I determined to sit up until noon and get the upper meridian altitude before committing myself to plans for the future.

This day's work has not been as satisfactory as yesterday's. We have advanced about three quarters of a mile. Ice openings bothered us, and it was not until eight A. M. that we had our supper at camp.

The weather was calm and foggy until the beginning of the day, and then it cleared rapidly away as the temperature fell to 22° , and a light west air sprung up. By eight A. M. the temperature was 28° , and the west air continued freshening to a light breeze. The sky was one half covered with cirro-cumulus clouds moving east.

We camped on an old piece of ice, and here we were soon brought to a stand. The country to the southward of us is terribly wild and broken. Mr. Dunbar, whom I sent ahead to reconnoitre, reports that it is such a jam and so full of holes that he could not crawl over it. However, *Nil desperandum*. Got soundings in twenty-five fathoms.

Chipp has become alarmingly weak. After walking one third of a mile to the halting place for dinner, he was completely exhausted, and though he remained on or in his bag until six A. M. (seven hours after), he was unable at first to get on his feet when we tried to take the hospital on to camp. Being assisted to stand he was clearly unfit to walk, and to his great mortification was compelled to accede to our request to be carried on in a dog sled. How are we to get him through?

At noon I obtained a meridian altitude, and this gave me latitude $77^{\circ} 42'$, and of this at least there is no doubt. My Sumner of this morning was accurate, and

my midnight observation was out only by the greater refraction of such a low altitude. I therefore accept the situation, and shall modify my plans to this extent. Instead of making a south course I shall incline more to southwest, for as the line of our drift is northwest, a southwest course will cross it more rapidly than a south one, and bring us quicker to the ice edge.

I turned in at one P. M., a fog creeping up with the west wind. I had piped down the men at 9.30 A. M., with orders to call all hands at seven P. M. This was done, but from a desire not to disturb me, no move was made toward getting alcohol until eight P. M., when I became aware that something was amiss and roused up to set it straight. In consequence we did not get breakfast until 8.45 P. M.

I find this morning my hands were so badly sunburned before our halt as to be now swollen and painful. A little cerate, however, soon made them easier.

Such a rough country as we have before us requires more careful examination than a short run ahead can give; and I have therefore sent Mr. Dunbar to seek a road out of our difficulty, while I let the camp remain "on their oars." After our hard day's work of yesterday, this additional rest is welcome, and if a good road is found we can make a long step this afternoon. At the same time there is no loss, for Ericksen and Leach have two or three loads yet in the rear to bring up.

CHAPTER XIII.

THE MARCH OVER THE FROZEN OCEAN.

26 June — 14 July, 1881.

Five Ice Bridges in One Day. — The Heat of the Sun. — Discouraging Progress. — The Reticence of the Captain. — Cheerfulness of the Men. — Beautiful Cloud Formations. — Vexatious Openings. — Paleocrystic Sea. — Daily Fog. — Wild Geese. — The Water. — Wet Beds. — Uncomfortable Dinners. — Hard Ice. — The Glorious Fourth. — Change in Character of Ice. — A Gale. — Half a Mile in Six Hours. — The Repeated Journeys. — Impossibility of Getting Position. — Needle Ice. — Cry of Land. — A Lost Bear. — Land and Water. — The Hard Work of the March. — Ferrying. — No Thoroughfare. — Condition of the Dogs. — Damage to Walking Gear. — Nearer Sight of Island. — Seal. — Mr. Dunbar goes to look for the Land.

JUNE 26th, *Sunday*. — Sat down to dinner at 12.15 A. M., and turned to at 1.15 A. M. Mr. Dunbar now returned, and I sent him to get his dinner, while with the bridge makers and two dog sleds I pushed ahead. Melville accidentally fell into the water and got wet to his waist, and during the morning's work the Walrus (No. 1 sled) fell in, sticking her nose well under the ice. However, she was dragged out. Though the road generally was better than yesterday, no less than five bridges had to be made, and consequently, when at 6.30 A. M. I halted and pitched camp, we had made good only one half mile south southwest. Before us, however, we seem to have a good road from south to southwest.

It has been blistering hot since midnight, though the thermometer marked only 23° *in the sun*. The sky was cloudless. A light S. S. W. breeze fanned along, but we all suffered from the heat. Our hands and faces are all swollen and blistered, and my hands are very painful.

At 7.30 A. M. had supper; at 8.30 A. M. read divine service, and at nine A. M. piped down; at six P. M. called all hands; at seven breakfasted, and at eight started ahead again. Dunbar first, road makers next, dog sleds third, and Melville, with the heavy sleds, last.

For breakfast had beef-tea (excellent), coffee, bread, and pemmican. By eleven P. M. the sleds and boats were advanced half a mile over a fairly good road, and the sick were sent to the front. A thick fog hid our flags, and I had to stumble and flounder along Mr. Dunbar's tracks to gain a place for marking a halt. I say the road was fairly good, though for the greater part of the way we had to wade through water nearly to our knees. At one half mile we had a bad place to cross, requiring some digging and bridging, but

June 27th, Monday, — one A. M., found us about a quarter of a mile further, and we halted for dinner. Turned to at 2.15 A. M., and from this time to seven A. M. we had the hardest time we have yet had. We succeeded in advancing only half a mile further south southwest, making one and a quarter miles in eleven hours' steady work. Just after leaving our halting place, we had another opening to cross twenty feet in width; and while we tried bridging it, it opened twenty feet more. After great exertion we succeeded in dragging in three large floes for bridges, and by herculean efforts got our sleds and boats over, launching first and second cutters. Drifting about one eighth of a mile

further, we had another ice opening about sixty feet wide, and to bridge this we had literally to drag an ice-island thirty feet wide and hold it in place. Hardly had we done this when the lead widened, and we had to scour around for more huge blocks to make them serve our purpose. There seems to be general slackness to the ice, and a streaming away without any resistance. It is hardly late enough to find leads of any length, but there are openings enough to give us serious trouble.

To work like horses all day for ten or eleven hours, and to make only a mile, is rather discouraging; and the knowledge that we are very likely going three miles northwest to every mile we make southwest keeps me anxious. Melville and the doctor are the only ones to whom I have communicated our latitude, and to them I intend it shall be confined; for no doubt great discouragement, if not entire loss of zeal, would ensue were such a disagreeable bit of news generally known. I dodge Chipp, Danenhower, and Dunbar, lest they should ask me questions.

Thus far everybody is bright and cheerful, and singing is going on all around. I hope our good health and spirits may long continue. Supper at 7.40; piped down at nine A. M. Found upon arrival in camp that the runner of the second cutter's sled was beginning to double under, so we dismounted the boat and left the relashing to be done by the successive men on watch.

Everybody complaining of the heat — at nine the temperature was 30° in the shade. It seems curious enough to see men seeking a shady spot in which to sit and smoke while the temperature is so low. At supper we found the tent exceedingly warm, and as soon as I

had it cleared I hung up a thermometer with the following result:—

One foot above the ice	37°
Height of my breast	40°

Calm and pleasant weather when we piped down. Called all hands at six P. M. Breakfasted at seven; under way at eight P. M. Some ugly bridging delayed us considerably, so that

June 28th, Tuesday, found us advanced only one half mile southwest. At 1.15 we had everything across the lead, and had dinner ready. At 2.15 A. M. we turned to again, and immediately had to tow a large ice-island into a lead, and placing all our stuff and boats on it made a flying bridge of it. Then we sped on a quarter of a mile farther, and at five A. M. pitched camp. When we started we had a cloudless sky, a blistering sun, light east airs, and a temperature of 28°. But toward dinner time clouds began to rise in the west, and passing around by north and by south at equal speed had entirely covered the sky by four A. M., and rain commenced to fall in large drops. The temperature rose to 30°, and the wind veered to S. E.

The cloud formations were, in the foreground, beautiful cirro-cumulus, which, nearly reaching the eastern horizon, assumed most striking resemblances to ice raised by refraction. Every hummock and peak was very strongly defined, seemingly. Following the cirro-cumulus were stratus, cumulo-stratus, and nimbus clouds, and frequently the rain pattered down from these last named. Though we could have gone on a short distance further before getting to an opening, I decided to camp, in order to save ourselves a wetting. Wet we were, it is true, below our knees, but this

meant only changing foot gear. At five A. M., therefore, camped. At six A. M. had supper, and after supper set No. 2 at work restowing sled, the lee boards having been left out last time.

Strong indications of water to the southwest.

Chipp is improving in health, and I hope in a few days the doctor will be relieved from the necessity of staying with or near him.

At eight A. M. piped down; at six P. M. called all hands; at seven breakfasted, and at eight started ahead. For one eighth of a mile we had fair going with no more road-making than what a few strokes of a pickaxe could do, and then we came to a very ugly piece of ferrying; an opening twenty feet wide filled with ugly lumps and blocks of ice had to be passed, and our only means available were to make a flying bridge. The wind set all these lumps down faster than we could clear them away, and our flying bridge was unwieldy. However, we got across somehow, and moved on, accomplishing half a mile before we halted for dinner at 12.30 A. M.

June 29th, Wednesday. — At 1.30 turned to. Right at our feet we had some road-making to do, and then we came to some very old heavy ice, dirty and discolored with mud, with here and there a mussel shell, and with a piece of rock on it, which, as it was similar to that on Henrietta Island, I carried along. Going ahead with the dog sleds and Mr. Dunbar we suddenly came to water, and peering into the fog it seemed as if we had some extensive lead before us. Going back hurriedly I sent the dingy ahead for an exploration, but, alas! it was fruitless. The favorable lead which we thought we had turned out to be another wretched opening seventy-five feet wide, which we had to bridge.

By great good fortune a large piece was handy, and by hard hauling Dunbar, Sharvell, and I succeeded in getting it in place, and a fortunate closing of the lead a foot or two jammed it in as a solid bridge. Unfortunately openings were occurring in our rear, and we had more bridging to do there.

Never was there such luck. No sooner do we get our advance across a lead than a new one opens behind it, and makes us hurry back lest our rear should be caught. By the time we have got a second sled ahead more openings have occurred, and we are in for a time. These openings are always east and west. By no means, seemingly, can we get one north and south, so that we might make something by them; and these east and west lanes meander away to narrow veins between piled up masses, over which there can no road be built, and between which no boat can be got. It is no uncommon thing for us to have four leads to bridge in half a mile, and when one remembers that Melville and his party have to make always six and sometimes seven trips, the amount of coming and going is fearful to contemplate. Add to this the flying trip of the dog-sleds, and the moving forward of the sick at a favorable moment, and it is not strange that we dread meeting an ice opening.

This very old and hard ice is beyond doubt what Sir George Nares calls "paleocrystic." I measured one place and found it thirty-two feet nine inches thick, and where it is not mud-stained it is rounded up in hummocks resembling alabaster. Over this we sledged and dragged well enough, though it was, as the men said, "a rocky road to Dublin." I encountered one piece, which was sixteen feet thick, and I am almost inclined to think was a single growth, for not a line of union of layers could be seen.

By 7.30 A. M. I arrived with the rear guard at the camp, after sounding in twenty-seven fathoms. I tried to get sights, but the fog was too much for me. To-day we detected the second cutter's runner preparing to double under, and it was at once repaired and relashed, getting the boat off the sled for that purpose. The port runner of No. 4 sled was found trying the same trick, and proper repairs were made by the watch while we were sleeping.

Chipp seems to be gaining strength.

The temperature has been steady at 30° all day, but it seems much colder; we always get our feet wet early in the morning, and that keeps us uncomfortable until we stop to camp; a thick fog seems to penetrate to our bones all day. And an unusual thing, a S. W. wind, is worthy of record. My barometer marks now 29.90", so it may have been right all along.

Supper at 8.30 A. M.; piped down, 9.30 A. M. Called all hands at seven P. M.; breakfasted at eight P. M.; underway at nine P. M.; wind S. W. From nine P. M. to 12.40 A. M.,

June 30th, Thursday, we advanced without much difficulty, only one or two small openings presenting themselves. In these three hours and forty minutes we succeeded in getting everything along half a mile, and then halted for dinner.

Toward midnight we had observed a long low line of black cloud in the west, extending from southwest to northwest, and it promised a rising fog. By the time we had halted it had spread around in its accustomed way north and south, and by 1.30 A. M. the sky was entirely overcast, a wet, damp fog like fine rain shutting in everything. The daily recurrence of this phenomenon makes me believe that we are drawing near

open water, for I hardly believe that such a fog could arise from ice openings daily. Towards midnight the sun's power wanes, and the water begins to give off heat slowly, which is condensed on being carried by the wind over the cold ice, and is deposited or carried along as fog, etc. Generally speaking, when we turn out at six P. M. the sun is brightly shining, and when we go to bed at nine A. M. is shining again. But between midnight and camping time it is foggy enough.

After dinner, 1.50 A. M., we pushed ahead again. By going in advance with Mr. Dunbar I managed to make out a long route of one and a half miles, and terminating in a good flat floe piece. But it required some little bridging and considerable road-making and managing, and a roundabout road of about five miles. However, we accomplished it with no other accident than breaking one St. Michael's sled and springing a cross bar of the first cutter's sled. While ferrying across a lead with Mr. Dunbar this morning, we saw a fish about four inches long dart out from a hole in the ice, and as suddenly dart back again. During our second summer we used frequently to see the same kind of fish, and I wondered if they were young cod or salmon. We never could catch one for a specimen. This morning we also heard some wild geese calling to each other, and a Ross gull was seen. This is the second we have seen since the ship sank. Is this their habitable part of the world? On top of the old ice which we have encountered we have met many pools of water which seem to me to be the same kind as those mentioned by Captain Nares, and from which the Alert's people drank steadily. Seeing some of these pools freeze to-day at 32°, I imagined they might be fresh water, but the doctor tested some with nitrate of

silver and found it contained much salt! Supper at nine; piped down at ten A. M., a long day's work, and I think two miles made good.

The sick being far enough convalescent to do without the doctor's steady presence, I assigned him to-day to the road and bridge-making; his force consisting of Mr. Newcomb and Lee. Alexey will now run with a dog sled helping Aneguin. Called all hands at eight P. M. Breakfasted at nine P. M. Under way at 10.30, repairs keeping us back. By one A. M.,

July 1st, Friday, had advanced everything one half mile over a fair road, and halted for dinner.

At two A. M. turned the hands to and pushed ahead until 7.30 A. M., when we halted and camped, having made good one and a quarter miles southwest in eight and one half hours' work. The road was a mixed one, sometimes very good and sometimes very bad, but as we had a fine, smooth piece in view for our camp, with a fine stretch of three quarters of a mile for our next tramp, we cannot complain at our luck. Some bridging we had to do, and of course much road-making, but we got through without mishap, except the knocking overboard of the doctor by the Walrus, and his getting wet through. During our first stage Sweetman repaired the St. Michael's sled, and consequently we had both of them running regular trips during our second.

Called all hands at six P. M. Breakfast at seven P. M. During the whole of our sleeping time the rain was falling in showers, and when we were called the pattering of the drops could be heard on our tent. Our bags are of course wet again, and in some of them, mine and Ericksen's particularly, the feet end is as wet as a sop.

Ericksen, Boyd, and Kaack turned in with dry foot

gear, and turned out wet to the knees. I managed to get my feet doubled up to a dry place, and slept with tolerable comfort for some hours, until my bones commenced to ache with the infernal hardness of the ice on which we were lying. Snow would be softer, of course, but the heat from our bodies would soon melt it, and we should be lying in a pool of water before long. There is so much snow-water all over the ice that we cannot find a place dry enough to make our rubber blanket a sufficient protection. At eight P. M. a few rain-drops were falling, and the sky promised copious showers. A light N. W. breeze was blowing, and, though there was no fog to speak of, it was difficult to see any distance. Not caring to run the risk of drenching everybody, I delayed marching until nine P. M., when the temperature being 30.5° I concluded we should have no rain, and gave the order to start. A fair road enabled us to move everything one half mile southwest by 12.30 A. M.

July 2d, Saturday. — When we halted for dinner I had gone ahead with Mr. Dunbar to select and make a road, but a thick fog shut in everything a few yards distant. By much groping we found a very rough and circuitous way to some *smooth ice* (*i. e.* ice with two feet of slush and water over it, and holes where you would suddenly sink to your knees), and got back in time to eat dinner. This dinner time is our most uncomfortable part of the twenty-four hours. Our feet and legs are wet in the first half hour of our marching, but as long as we move ahead we do not mind it; but when we halt for dinner our feet become cold, and generally remain so until we camp at night and change our foot gear.

At 1.30 A. M. turned to, and sent one hand from each

tent to help the road and bridge makers. These so quickly cut out a road for us in a roundabout mass of confused ice that by three we had got everything on to the "smooth ice" before referred to. This "smooth ice" led to another piece where the water was knee deep, and we plowed everything through it by five A. M. — a good three quarters of a mile since dinner. Here we were confronted by a terrible mass of hummocks and rubble, but, setting the road makers at it in advance, no delay was occasioned, and we jumped everything through it on to some "old-fashioned ice" (Ericksen) *i. e.* paleocrystic, by 6.45 A. M., and pitched camp. Supper at 7.30 A. M.

Called all hands at six P. M. Breakfasted at seven P. M. A brisk N. N. W. wind; barometer 29.95 at 38°; temperature 29.5°. Rain and snow at various times during our stop. The temperature and our sleeping in wet bags make us somewhat cold and stiff, but that will soon wear off. We have the satisfaction of knowing now that this wind will dry our wet bags and foot gear. At 8.30 P. M. advanced through a very rough and confused "skeleton pack" for one half mile, after which we fell in with some smooth ice, with but little water and snow on it, and this extended for about one mile on our course. It took us until 12.30 A. M., —

July 3d, Sunday, — to get all our sleds and boats up to the beginning of the smooth ice, and then we halted for dinner. The sun now began to try to force its way through the clouds and fog, and it seemed to grow much colder. My thermometer being packed away, I did not verify my sensations.

To avoid the wind as much as possible the boats were slued around across the wind, and we huddled under their lee while we ate our dinner. Having placed flags

ahead farther than we had been able to go before dinner, I instructed Melville to move everything on to the last flag, while I went ahead to plant more. By 3.30 A. M. I had marked out a point which I considered a good two miles southwest of our last camp; and concluding this would be as far as we should be able to drag our loads, I sent word back by Dunbar to Melville, and ordered my instrument box sent to the front. The sun was now showing at times, and the clouds and fog were rolling away before the N. N. W. wind. The barometer was at 30, and the thermometer at 27°, the latter accounting for the clearing weather; ahead of us a smooth road extended for a mile, apparently giving good promise for to-morrow. The fog in rolling away disclosed a few cirrus clouds, promising good weather, and the low temperature seemed to insure our having the sun long enough to get our wet clothing and sleeping gear dry. At 6.45 A. M. everything was up and we pitched the camp. At 7.30 had supper. At nine A. M. read Articles of War, and had divine service. At 9.30 A. M. piped down. Everybody is bright and cheerful, and apparently (except Chipp and Danenhower) in excellent health. We have abundance of food, good appetites, sleep well, and, as Mr. Cole expresses it, he "seems to get more spring in him every day." My sights place us in 77° 31' N., and 150° 41' E., a change in position since June 25th of thirteen miles S. 30° W. As our distance made by account is twelve miles, it would seem that we have had no current against us. But of course I cannot tell; we may have been set down that much in three days by our northerly winds, and therefore I must accept the position as simply showing where we are, and push on for the edge of the ice.

Called all hands at seven P. M. Breakfasted at eight P. M., under way at nine P. M. Chipp seems so much better that the doctor has concluded to stop his whiskey for a day or two, to see if he can gain strength, or keep what he has, without it. By ten P. M. the wind was very light from the southeast, temperature $25\frac{1}{2}^{\circ}$, and a long, angry series of cirrus clouds and mare's tails extended from northwest to southeast. Beautiful summer temperature!! Having remained behind to work out my sights, I now, at ten P. M., hastened forward, and was able to fix upon a good place one and a fourth miles southwest for our dinner, and accordingly had things brought to that point.

July 4th, Monday. — At 1.45 A. M. halted for dinner. At three sharp set out again, and though some little confusion was imminent because the Walrus took the wrong road, we avoided all serious delay, and by 6.20 A. M. had advanced everything one mile more, making the, to us, unprecedented distance of two and one fourth miles southwest in eight hours and twenty minutes. For the last one fourth mile our course lay over some beautiful hard ice parallel to a narrow lead, and we were able to send two sleds ahead at a time, and the second cutter and whaleboat together, making the first cutter our only "all hands" haul. This reduced the number of trips from seven to four, a great saving, — though possible only for short stages, because such work soon exhausts the men's breath. Having been sixteen days under way, we have sensibly reduced the amount of our provisions hauled on the dog sleds, and in consequence the dog sleds get home some little time in advance of the boats and heavy sleds. I have therefore ordered the bags to be removed from the Walrus, and the top tier of bags from the "bread sled," assigning

them to the quick-running dog sleds, and in this manner I hope to lighten the heavier sleds so as to enable the men to haul two sleds at a time. While the after-dinner work was going on, Mr. Dunbar and I went ahead to look for a road for to-morrow. At the camping place we seem to have come to the end of the heavy, smooth floe over which the last half of yesterday's and both portions of to-day's work was done.

The narrow lead which I mentioned as running parallel with it for the last one fourth mile separates it from some disconnected pieces of ice of last winter's formation, extending for about a mile, and then we seem to come to some old ice again. The prospect is not bad; I find we are not consuming our daily ration — one pound of pemmican — nor have we ever done so; and, strange to say, the dogs do not sometimes eat theirs. We all like it amazingly, eating it cold three times a day, like cake out of our hands, but yet we seem to have enough on less than a pound.

Our greatest comfort morning and evening is Liebig's Extract, or beef-tea. Our daily allowance of one ounce per man is sufficient to give us a pint morning and evening, and I know of no more refreshing and comforting thing up here than this same warm drink. Some tents take the whole ounce at dinner, but we in No. 1 prefer it when we get up, and when our day's work is done.

I find, also, that one pint of alcohol is necessary for each tent each meal to cook coffee, beef-tea, or chocolate, as the case may be, and to melt enough snow and broken-down ice-crystals for drinking water. This, I am sure, is in excess of former sledge travelers, but as yet I can see no way of reducing it. Supper at 7.15 A. M. Our flags are all flying in honor of the day,

though to me it is a very blue one. Three years ago to-day in Havre the Jeannette was christened, and many pleasant things were said, and anticipations formed, all of which have gone down with the ship. I did not think then that three years afterward would see us all out on the ice with nothing accomplished, and a story of a lost ship to carry back to our well-wishers at home. My duty to those who came with me is to see them safely back, and to devote all my mind and strength to that end. My duty to those depending on me for support hereafter impels me to desire that I should return also; but those two duties apart, I fancy it would have made but little difference if I had gone down with my ship. But as there is nothing done without some good purpose being served, I must endeavor to look my misfortune in the face, and to learn what its application may be. It will be hard, however, to be known hereafter as a man who undertook a Polar expedition and sunk his ship at the 77th parallel. Piped down at nine A. M. Called all hands at six P. M. Breakfasted at seven P. M. Under way at eight P. M. Three hundred yards from our camp we came to an ice opening one hundred and fifty feet wide, right in our way; as we are now doubling our fleets, that is, dragging two sleds at a time, such an opening was a serious inconvenience. A small, thick floe piece was floating in the middle of the lead, and I hoped to get that pressed into service before any delay could occur. Sending for the dingy I succeeded in getting this lump in tow, and ready for a flying bridge, or ferry, while the other boats were coming up. Second cutter and two sleds were then carried across, the remainder being kept behind for a second load, and to avoid an accident involving loss of our provisions. However, everything got

across all right. Soon after we had to make a second ferriage, and then a number of bridges before we reached the hard ice which Dunbar and I had visited before our last camp. Ice which was connected then was all open and moving now, and it was not until one A. M.,

July 5th, Tuesday, that we had everything in sufficient security to sit down to our dinner. The snow was falling quite heavily in large flakes, and we rigged up our rubber blankets from the boat's rails to protect us, making our dinner-halt look like a small country fair, as some of the men said. I could not help remarking that there were many people under canvas in Hoboken to-day picnicking, who would like a little of the coolness we were now having, but it seemed to provoke a desire to exchange places with them, and I said nothing more.

At two A. M. we turned to and went ahead. Ice openings again annoyed us somewhat, but we set to work bridging them. While so doing the whole pack seemed to get alive, and the tossing and tumbling that went on for fifteen minutes were uncomfortable to witness. Large floes, which had been held under others, became liberated, and rising to the surface floundered around like huge whales; where the floe edges came together large blocks were broken off, and reared up on end twenty-five and thirty feet high; a mass of rubble coming together raised an enormous piece, until it stood like a monument thirty feet above the surface of the floe. Long, thick snouts shoved up above and over even floe pieces, like immense snow-plows, and groans and shrieks came from all directions as these snouts rose and advanced inch by inch; where long floe pieces reared up to thirty feet and toppled backward, they broke in large lumps and scattered themselves for

yards. And yet we seem to have got out of a paleocrystic sea. Our road yesterday and to-day has been over ice that more nearly resembles the pack we entered near Herald Island than anything else, and with occasional exceptions seems to be one season's growth, the thickness varying between seven and ten feet. If this be correct assumption, we may be out of the drifting pack and in the ice clinging to the Liakhoff Islands, in which case I hope many days will not elapse before we get in a lead to some purpose.

Chipp is not nearly as strong as he would have us believe. I mentioned yesterday that the doctor stopped his whiskey to see the effect. Last night (our sleeping time) Chipp ate nothing, had no sleep, and was groaning and tumbling around all the time. This we learn from Dunbar, for Chipp asserts he is "first rate," and tells Dunbar to say so when he is asked by the doctor. Foolishly enough he wants to be discharged to duty, thinking he is able to do work.

Going ahead I marked a camping place, which we reached at six A. M., having made good two miles in a southwest line. Called all hands at six P. M.; breakfasted at seven P. M.; under way at eight. About five hundred yards from camp we came to a lead which we easily crossed, and then had some fine sledging for one quarter of a mile along its eastern side on our course. We spun along merrily enough this stretch, and were then confronted by a ridge of large floe pieces through which we had to dig a road. This was done while the boats were being brought up, and the sleds were got through; but before the boats could be got along the ice commenced to open, and we had great difficulty in getting boats and dog sleds through. Meanwhile I had pushed on and laid out a road, and

directed Mr. Dunbar to proceed ahead of the dog sled to mark it for the heavy sleds, while I remained at the opening ice-ridge. Toward midnight the sun made several ineffectual attempts to break through, and a line of soft fog rested low down between south and west. I was somewhat in hopes that the sky would clear and the fog roll away and show us land, but no such good luck attended us. Sometimes it snowed, at others a mist, cold and searching, surrounded us.

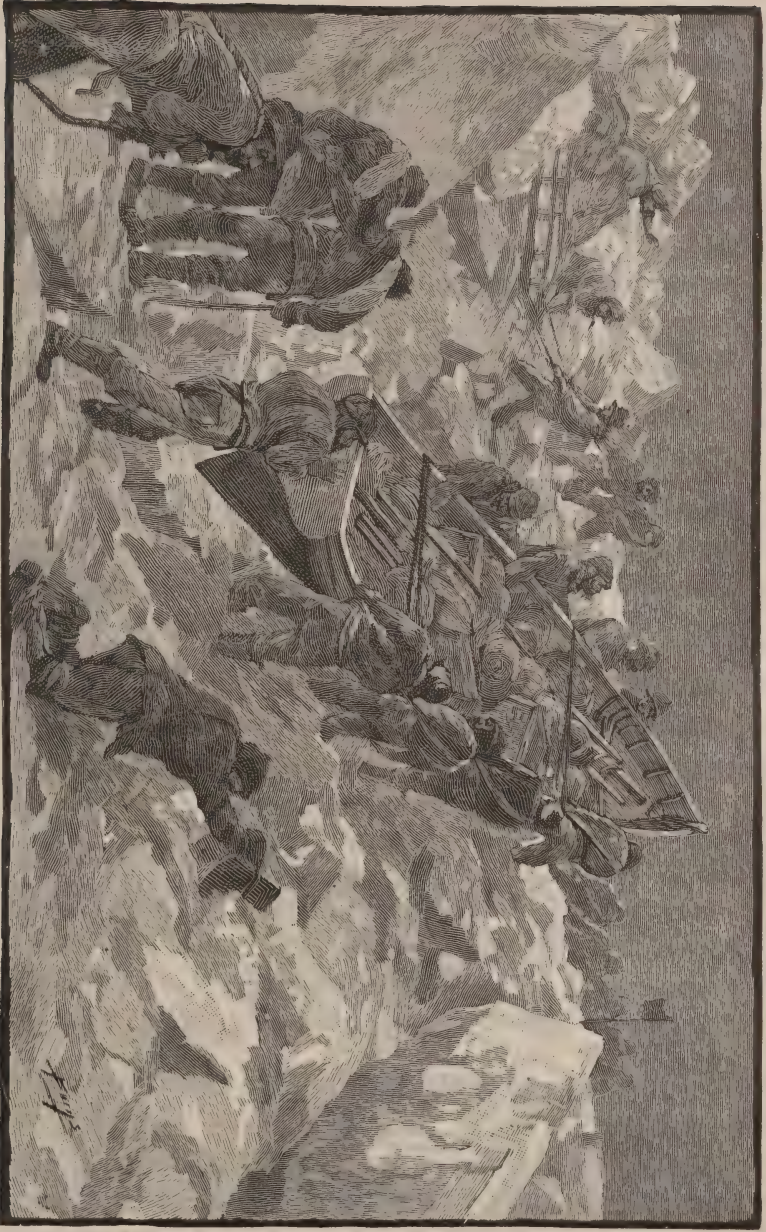
July 6th, Wednesday, one A. M., found us halted for dinner, about a mile from our starting point, at the edge of a broken mass of floe pieces and water. The wind had got to S. S. W. and began to freshen, and the mist was colder and wetter than ever. At two A. M. we turned to and immediately hooked on to a large ice-cake for a ferry boat, and placing two provision sleds and the dog sleds on it, we hauled it along two hundred yards to the other side of the lead, launching and paddling the boats after it. This took some time longer than necessary, on account of the line parting and the dingy getting adrift, but we finally had our things ferried by four A. M. Pushing on across a second lead we dug a road over a ridge of piled up hummocks, and had nearly completed our second mile for the day when we were checked by an ice opening thirty yards in width. As I generally wait to see the rear safely up before pushing ahead, nothing was done until I reached the front again. A large piece conveniently at hand was seized upon as a bridge, and things rushed across to a camp at six; but it was not until 7.30 A. M. that I came up with the rear guard, and sat down to my supper — cold, wet, and hungry. Ericksen (who had no sleep last night on account of toothache, and who suffered very much to-day) brought up the dingy as a finish to our day of ten and a half hours' work.

The after bearer of the first cutter's sled was found sprung, and the runner lashings slack. Ordered the watch to repair during our sleep. Several Ross gulls and three seals seen to-day. Piped down at nine A. M. Called all hands at six P. M.; breakfast at seven P. M. A gloomy, disagreeable day, and unless we want soaking wet jackets we must stay under our tents. As soon as breakfast was over I sent word around that no start would be made until the weather improved. We are evidently having a S. W. gale, an unusual thing in our experience of two years, and it would be a matter of pleasant interest, were it not also a subject of much anxiety, to remain quiet and see where it would drift us. This wet day and consequent halt come in opportunely, for the men are enabled to repair their worn and leaking moccasins. Our sleeping-bags, alas! are again wet, and in fact it is a miracle when they are dry. If we keep wet this way all the hair will come out of the bags, and we shall lie down on the bare skin. Up to midnight the wind tore around us in fierce gusts, threatening to blow our tents away, while the rain beat down almost steadily. Though cold and damp, if not to say wet, we were in tolerable comfort, because sheltered. The dogs crouched under the boats, or whatever else afforded a shelter, while we, human beings, stayed within doors. The wind continued at S. W. true (all directions in this journal are true); the barometer fell to 29.30 at 36°, and the temperature rose to 33°. If this blow does not sweep us to the northward again, which I very much fear it will do, it will do us good in two ways: break up the ice and improve our traveling.

July 7th, Thursday. — Had dinner at midnight. The wind freshened a little, the temperature fell to 30.5°, and

the barometer fell to 29.28 at 36°, and there remained. The rain ceased, and I am now looking for a change of wind to northwest. Everything had such a stormy and unsettled look, however, that I decided to remain in camp until our usual starting time, or a little earlier, perhaps. Aneguin shot a seal, but it sunk before the dingy could be run down to the water. Twenty-three fathoms water, and rapid drift to leeward N. E. Supper at six A. M. Mounted the first cutter again on her sled. Nindemann felt ill to-day, and in order to let him get quiet and warm, the rest of us in No. 1 tent turned in at seven A. M. Wind canting a little to the westward, but the barometer sticks at 29.28, and the temperature stood at 32°. A heavy fall of snow in large blotches like a bunch of feathers. Piped down at nine. Called all hands at six P. M. During our sleep the wind had got to N. W., and was blowing in fresh squalls. The sun occasionally appeared. The barometer had risen to 29.42 at 35°, and the temperature was 30.5°. Got under way at eight P. M., and by seven A. M.,

July 8th, Friday, had completed one mile after the most disheartening and discouraging day we have yet had. The fresh N. W. wind had opened the ice in all directions, except the one we wanted, and a constant succession of ferriages and bridges fell to our lot. The wind seemed very searching, and finally our customary fog and misty rain set in, making us wet as well as cold. We did not have dinner until two A. M., it taking us six hours to make our first half mile. At three we turned to again, and by seven went into camp. Supper at 7.30 A. M., piped down at nine A. M. Called all hands at six P. M.; at 7.45 snow-squall; at eight P. M. got under way, and, thanks to a good road, were able to push on in such good style that at 12.05 A. M.,



DRAGGING THE BOATS OVER THE ICE.

July 9th, Saturday, we had advanced everything one and one quarter miles, and had come to a halt for dinner. Our traveling to-day must make up for our mishaps and delays of yesterday. We can do well enough when the ice holds together. It is only these ugly openings which make us lose ground.

Now that we have two of the sleds lightened and the dogs' work increased, I find that the men have to go over the same ground four times each way, minus one, and the dog teams five, minus one. This means that at the first trip they bring up two sleds; second trip, two sleds; third trip, first cutter; fourth trip, second cutter and whaleboat, and, generally speaking, they and the dog sleds finish the day's work at the same time. One mile made, therefore, means seven miles traveled by men, and nine by dog sleds. What with coming and going, — getting ahead to select road and going back to see the rear close up, — I am three times over our road night and morning, and I know from my own sensations how welcome the camping hour must be to Melville and the men. Alexey stills hangs to his work, though under the weather from indigestion. I learn from the doctor that one cause of Alexey's downheartedness lately was because his father and uncle died from the same disorder, and he feared he was surely about to follow them; and another cause was his anxiety lest he should not be paid because he was sick, and thus Aneguin would get more money than he. He seems to have a wonderful confidence in our ability to provide him with everything, for he very seriously told the doctor yesterday that he would like some mutton! When pemmican has to be fish, flesh, and fowl to us, his request was somewhat amusing. The northwest wind continued fresh while we were at dinner, and though we covered

under the lee of the boats we were cold and miserable. Our usual fog made things still more uncomfortable, and I think no one was sorry when at 1.10 A. M. I gave the order to turn to and go ahead.

A short distance from our dinner camp we saw a seal iglôo, where, no doubt, a seal had had her young. The communicating hole to the water remained, but the snow part or covering had melted away. Farther on we saw some bear droppings several days old. We have struck some old ice again, and our going promises to be good. There are no signs of any openings, and I hope to have accomplished three miles altogether by the time we camp. This would be our best day's work in that case.

Though this is old ice I do not mean to say it is paleocrystic. It is of more than one year's growth. Numerous snouts, smooth, hard, and in places muddy, stick up above the level to a height of twelve and fifteen feet, and I notice they all point to southeast, as if the jam came from northwest. My German chart says the prevailing winds at the New Siberian Islands are from southwest and northwest in winter, and it does seem as if we were having similar here. Toward three A. M. the wind backed to W. N. W. Sometimes snow, sometimes fine hail. Though we had a good road, comparatively speaking, everybody was tiring with the numerous "fleets," and it was not until 7.30 A. M. that the last boat was hauled into camp, — over three miles accomplished since eight P. M. yesterday.

I am not sure that I make anything by this, for everybody is fatigued, and, perhaps, will not be very fresh for hauling this evening. We have one and one half miles same kind of road flagged out ahead of us. Supper at 8.30 A. M. Piped down at 9.30 A. M. Called

all hands at six P. M. Breakfasted at seven P. M. The wind went down during our sleep, and we found, on awakening, a light west air, temperature 32.5° , barometer 29.90 at 42° , and, wonderful to relate, some sunshine, with a promise of more by and by if our accustomed fog does not intervene. The ends and undersides of our sleeping-bags are now like pulp from wet, and though enough hair remains dry inside to swear by, there is not much comfort in them. Got under way at eight P. M. One and one half miles by 12.15 A. M.,

July 10th, Sunday, at which time we halted for dinner. We had had considerable sunshine thus far, but now the fog began to shut down on us. Unfortunately the lower meridian altitude is too low for me to get it in an artificial horizon, and there has been too much wind ruffling the ponds for me to use them instead of mercury. So whenever the sun *has* shone at midnight, which has not exceeded three times since our start, I have only once got his altitude. To-day we encountered considerable "needle ice," so called by Parry, and by him attributed to the action of rain drops. In our opinion this is caused by the more rapid drawing away of the salt in some places than in others, leaving bunches or tufts of long spikes. A piece of honey-comb cut down through shows the same general formation. In one or two places there were large mats of it, trying alike to dogs' feet and moccasins. Light airs and calms, with occasional snow-squalls. At 1.15 A. M. turned to, and went ahead and had a fine road. By five A. M. we had reached the end of the smooth floe commenced on yesterday, and had come to a lead separating almost entirely this floe from another, and somewhat rougher, but still not difficult. Over a small neck of connecting ice I pushed everything, lest

an opening should occur during our sleep, and at 6.40 A. M. pitched camp. In the lead several seals were seen, but as soon as rifles were obtained they were remarkable by their absence. Got a fair Sumner this morning, from which I determine our position to be latitude $77^{\circ} 8' 30''$ N., longitude 151.38° E., a change of position since the 3d of twenty-six and three quarters miles S. 30° E. By account we have made about sixteen miles southwest, so this shows how little can be done with any certainty. Keeping on in our course is all that can be accomplished, and, in my opinion, if our longitude be right, a southwest course soonest brings us to the edge of the ice.

Supper at 7.30. Divine service at 8.45. Piped down at nine. After supper quite a little excitement was created by the cry of land. To the southwest there was something which certainly looked like land, but the fog assumes so many deceiving forms that one cannot be sure of anything. The nearest Siberian island is one hundred and twenty miles from us, and, unless we are going to discover new islands, I cannot believe that we have seen land to-day. I think we made good three and a quarter miles to-day in nine and one half hours' work.

At piping down, light northwest airs. Barometer 30.05 at 40° . Temperature 32° . Called all hands at six P. M. Breakfast at seven P. M. Under way at 8.15 P. M. Some little delay was occasioned by my sending around a bag and the following order: —

July 11th, 1881.

Officers in charge of tents will please have collected and placed in this bag *all* loose ammunition. This bag will be carried in the first cutter, and will be in my charge. In an emergency, while marching, or encountering any game while under way, any officer at hand may serve out ammunition at his dis-

cretion ; but when encamped, such serving out is to be done by me.

Respectfully,

G. W. DE LONG,

Lieutenant Commanding.

Being somewhat backward in my writing, and having a road marked out for half a mile ahead, I sent Mr. Dunbar ahead, next the doctor with his road makers, and then Melville and his haulers, while I remained behind to write up my journal.

At nine I started forward and met Aneguin coming back in haste for a rifle, saying that Mr. Dunbar had seen a bear. Getting to the front, I met Mr. Dunbar, who, sure enough, had encountered Bruin, and like a prudent man, having nothing more dangerous than a boarding-pike, took to his heels. While turning a sharp corner, he met the bear at thirty yards distance, and, upon retreating, was followed in chase for a short spell. The bear then sat down and looked at him, and, while Mr. Dunbar was waiting for a rifle, waited conveniently in the neighborhood, leaving only as Aneguin with the weapon came in sight. Chase was given, but with the usual result — *nil*. By one A. M.,

July 11th, Monday, everything was advanced one and a half miles, and I was counting upon completing another three miles this day, when a lead was found open a quarter of a mile from our dinner camp. Every time I stopped before midnight I could hear the soft roar of water lapping against ice, and I was not much surprised when water was found close at hand. Turned to at 1.50 A. M., and advanced everything to the lead by 3.50. The opening had widened considerably, and several of them followed in close succession, requiring ferrying and bridging, and at 6.40 A. M., when we pitched camp, I am sorry to say we had advanced **only** two miles altogether instead of three.

While waiting for everything to come up to the first ferry, I was much struck with the unusual appearance of the clouds to the southwest, which gave more indications of water than anything we had yet seen. Calling Mr. Dunbar's attention to them, he expressed his opinion that such clouds did not hang over ice. Climbing to the top of a hummock twenty feet above the water-level, and examining carefully with a glass, I saw unmistakable *land* and *water*. It now appears that this was the land seen yesterday. At all events it is land, sure enough, and water, too. What it may be no one can say — whether newly discovered land, or (our longitude being out) some portion of Siberia. It can hardly be any one of the Liakhoff Islands.

Another pleasant feature is our course, southwest being a straight line to it. My change from south to southwest may therefore be a wise act, resulting in our speedier liberation. Judging by ordinary distances, I should say the land is ten to fifteen miles distant; and as I could see quite a large expanse of water, with long streams of detached ice, it may be that once at the margin of this ice-field through which we are now toiling we may have open water to the Siberian coast, thus verifying some part of the statement of Russian explorers. We have exploded so many theories of other people that it will be hard to make us believe that we can have left the ice behind us short of the Arctic circle.

One month ago to-day our ship went down, and I do not see any one the worse for the work that has fallen to us since. That it is hard work there can be no dispute. It is conceded by everybody to be the hardest work they ever did. The drag, drag, the slips and jerks, the sudden bringing up of the hauling belt across

the chest, are fearfully trying; and the working with pickaxes through flinty ice makes every bone ache. From the looks of the weather at camping, I judge we are in for a southeast blow. The sky is overcast, a nasty fog shuts in everything. If we have a southeaster we may be blown miles to the northwest before we can get to this land or water.

Our cocoa and chocolate being exhausted (to my satisfaction, for I like neither), we commenced this evening (morning) on our tea, — one ounce per man is too much, and I shall reduce it to a half ounce. Pipe down at nine A. M. Men to stand watches of two hours. Called all hands at six P. M.; breakfast at seven for everybody but No. 1, and we were delayed until 7.20; occasionally the cooks get bothered with the stoves, and this was the case with our cook, Ericksen, this morning. Found the barometer had fallen to 29.55 at 38°, and the temperature risen to 35°. A thick fog shut in everything at short distances, but we had so much water around us that we seemed already to have reached the margin of the ice. Rain fell at six P. M. heavily, and the S. E. wind, which blew freshly during our sleep, was now only a moderate breeze from south southwest. At eight P. M. I took the dingy and went ahead to look at our prospects. So much fog prevailed that from the camp it was impossible to see the other side of the water around us. Just after I started rain fell again, but the wind shifted to southwest, and a clearing along the horizon indicated a change for the better. I found that in order to make any progress we must ferry our things down a lead about three hundred yards in length, and then drag them across an intervening floe piece to another lead which we must cross. Emptying the first and second cutters at nine P. M., they were made to

serve as ferry boats. Hauling loose packages, tents, sleeping-bags, knapsacks, and even dogs and dog sleds was easy enough, but the loaded sleds gave much annoyance, lest improper managing should damage a boat. Using the first cutter alone for this purpose, and hauling one sled at a time over the stern, two trips were made, and then I took her and gave her the two remaining sleds to carry, one over the bow and one over the stern, while six of us got amidships to distribute weight while we hauled her over. It was risky, I admit, but I did not want to lose the time which would be required to unload, load, and relash the four heavy sleds. I do not think, as it was, we made more than one quarter of a mile good when the arrival of —

July 12th, Tuesday, gave the signal of halting for dinner, which we ate at one A. M. The weather was sensibly colder, and the wind had veered to the west. The sun began to show brightly, and we could see for some distance. The ice ahead of us had all opened with the change of wind, and ferrying was the order of the day. Though not disagreeable work it is at times fearfully slow, particularly when no suitably sized pieces are at hand, and we have to take an island as long as a mail steamer, and seven to ten feet thick, for a ferry boat. However, over we went, traversed two floes one quarter of a mile each in extent, and, finally, at 6.30 A. M., halted and camped on an island of ice five hundred yards in diameter, and averaging ten feet in thickness, as the best camping place available. Our outlook was not encouraging. Lanes of water not large enough to help us, but wide enough to bother us, and some rough-looking ice lay before us for our next task. The wind had got to northwest and the weather was bright and sunny, but somewhat squally. Distance made

good one and a half miles. Nothing could be seen of the land and water we saw yesterday. The southwest horizon was foggy. Many dovekies (guillemots) were seen, several gulls, one auk, and, strange to say, the doctor picked up a *live butterfly*, which I have preserved. This last is not an *habitué* of the ice, and was certainly blown from the land by the southeaster of yesterday, or by the southwester which followed it.

Supper at 7.30 A. M. Nobody under our conditions could write very fully all the occurrences of a day, and I am very glad before turning in each morning to remember even as much as I write. The hundred trials and difficulties in getting along, the heavy hauling, etc., are regular, and once mentioned need no repetition. No doubt, one of these days I can more satisfactorily describe our march over the frozen ocean, but just now these rough notes must suffice. Sounded in twenty-three fathoms; muddy bottom, rapid drift S. E. Piped down at nine A. M. Called all hands at six P. M.; breakfasted at seven P. M.; fresh N. W. wind; barometer, 30.05 at 40°; thermometer, 31°; cloudy and foggy; under way at eight P. M. Immediately we had to ferry all our things across from the island on which we camped to the one alongside of it, and from there to adjoining ones, and at 12.30 A. M.,

July 13th, Wednesday, we had only made one half mile good, reaching then a strip of ice about a mile long. Halted for dinner, and at 1.50 went ahead again. Traversed this one mile piece, and then came to an opening about two hundred feet wide, separating us from an ice-island, which on the opposite side was near enough to a floe piece to make access easy. By great good luck there were three large cakes floating along this two hundred foot opening; we seized on

them, dragged them into position for a bridge, and were thus able to proceed without much delay. Beyond them was a long, flat floe one half mile in extent northeast and southwest, and probably five miles northwest and southeast. As we only took so much of it as was on our course, the one half mile was all that we traversed, and at 6.35 A. M. halted and camped, satisfied that our one and three fourths miles were well made. While the boats were being brought up, Mr. Dunbar and I took the dingy and went down the lead at which our floe terminated, to see what it promised. It resulted in nothing except giving me a high hummock from which I could see well around me. I at once made up my mind that to go on our course tomorrow would be impossible. For not only did we have a fearful half mile of repeated ferrying before we reached good ice again, but the unloading of the boats, and a whole day, would be thus involved. By going across the lead due west we had a level floe running west southwest for two miles, which then connected with good ice, and would enable us to resume our course southwest. This I decided to be my plan of action on again breaking camp. Returning to our camping place I again saw the curious-looking clouds noticed in the southwest on the 11th, and looked anxiously for the same land and water then seen, but was disappointed. Shortly after Mr. Dunbar came to me and said he saw the open water. After some looking in vain, I at last saw it, with ice-streams in it, but no land, and judging from relative distances and my range of view, I think it was inside of eight miles southwest. The weather since midnight had been dull and gloomy. Large ponds, larger than any we had yet seen, were crossed, and more lay beyond us. These, and the remarkable

looseness of the ice, led us to infer that we were near open water. As a good clear horizon would decide this question beyond doubt at any time, our foggy weather is all the more deplorable before camping.

And now occurred the first serious breach of discipline among the crew since our commissioning, over two years ago, and on the part of a man whose conduct has been so uniformly beyond reproach as to make it the more surprising. It appears that Melville had placed a pair of soles in the stern of one of the boats, and the shaking of the boat in dragging had shifted them on the sleeping-bag of Ed. Starr (seaman). Upon halting to camp, Starr went to the boat, picked up the soles, and flung them some distance on the ice, in a temper. Melville informed him they belonged to him, and ordered Starr to pick them up, at the same time saying, "Don't do that again." To the order Starr paid no attention, but growled something about wet soles and his sleeping-bag, and he did not care whose they were. Hearing Melville repeating his order, and Starr making argumentative and sulky replies, I went to the scene, and to my surprise found Starr showing no intention to pick up the soles, but continuing to speak in a surly and disrespectful manner. I at once ordered him to stop talking, and to obey Mr. Melville's order. He paid no attention to either order, but continued his rummaging in the boat; and his growl continued, "A nice place to put wet boot soles," etc., etc. And it was only upon my three or four times repeated order to pick up those soles that he did so. But to my order to keep silent he paid no obedience till he apparently had no more to say. I ordered him to stand apart from everybody, and in a few moments asked him if he had anything to say in explanation of his conduct,—disobedience of Mr.

Melville's orders, and disobedience of the orders of his commanding officer. He had nothing to say beyond mildly offering a statement that he did not know Mr. Melville was speaking to him, which, to say the very least, is preposterous. I at once put him off duty.

Piped down at nine A. M. Called all hands at six P. M. Breakfasted at seven P. M. A clear, bright evening and calm. Upon looking to the southwest a land-like appearance was to be seen, and several declared they could also see the water. The sun at this hour strikes at right angles, nearly, to anything southwest, and consequently prevents clear views. But if we can hold this bright weather until four A. M. to-morrow, the sunlight will then be at our backs, and upon the supposed land and water, and we can have a good positive view.

Under way at eight P. M. Crossed the lead near the camp, and swung along on a west southwest course, as mentioned in my remarks at camping. During our sleep, however, several small openings had occurred in the large ice floe, and we found ourselves obliged to bridge. It was not until 12.30 A. M.,

July 14th, Thursday, that we had reached the good ice, and were enabled to lay out a track on our south southwest course. We now halted for dinner. At two hours before midnight a breeze had sprung up from northwest and brought up masses of fog, which soon spread over the whole sky, and during our dinner we were dampened and chilled by the change from the bright sunlight.

I have hitherto forgotten to mention that within a few days some of our dogs have been attacked with fits. First, the dog Jim; his fit took him while in harness, and lasted for some time after he was cut adrift.

Not much foaming at the mouth, but long continued shaking, as if suffering from cold. Next, Foxy had a bad fit. Then Tom had a queer sort of attack; he acted as if dizzy, and spun around for a minute or two before attacking his partner in the harness, Wolf, which he did as if thinking Wolf answerable for it. With Tom it has seemed to stop, for two days have elapsed without any new cases. Foxy now heads the team which the doctor has to draw the dingy, which team consists of seven of our poorest dogs. Ericksen has seven of our best. Alexey seven good ones. Poor Jack (Joe), with the lame back, has been accidentally left behind at some lead or other, and the remainder are so mean that they are not worth hitching up. Turned to at 1.50 A. M. and went ahead, and though the road was somewhat ugly, requiring much road-making and some bridging, at 6.20 A. M. we had accomplished two and a half good miles, and went into camp.

The weather remained anything but satisfactory. Sometimes the sun broke through the fog and gave promise of pleasant weather, but fresh volumes of fog rolled up from the northwest and shut in everything. When we camped we had a succession of snow-squalls.

I noticed during the day that the small ponds on the ice were freezing over, and upon camping I was struck with the fact that upon the thin ice was plainly visible the "efflorescence," or expressed salt. If the fact that this pond water remained liquid *below* the temperature of fresh water freezing were not sufficient proof that it contained salt, the oozing out of the efflorescence after it does freeze is surely proof positive. Our men's boot-soles are wearing out so rapidly on the sharp ice over which we are traveling that their demands for

repairs exceed our supply. I have already authorized the use of the leather from the dingy's oars, and this morning I had to have the leather cut off the first cutter's steering oar for patches. This leather will last longer than skin patches, it is true, but I hope the time is not far distant when I can have at least this one care and anxiety removed from my mind. Supper at 7.20 A. M. Piped down at nine A. M. Called all hands at six P. M. Breakfast at seven P. M. Moderate N. W. wind; weather dull and gloomy, with some fog. Under way at 8.15 P. M., some little time having been lost in harnessing up the dogs. Some of them, during our sleep, devoted themselves to eating the hide part of two harnesses carelessly placed within their reach. There were no less than eleven openings in the ice ahead of us before dinner, and we had to bridge and watch three of them. In momentary fear that all eleven might open and give us any amount of trouble, I hurried everything along with all speed, and I am satisfied that by one A. M. we had made a good mile and a half.

July 15th, Friday. — Before midnight the horizon to the northwest began to brighten, and there were indications of a clearing. The heavy masses of fog and clouds began to roll away, and occasional glimpses could be had of the sun and blue sky, with cirro-cumulus clouds which seemed to me to be rising from the southeast. By midnight the sky was clearing also to the west and southwest, and I was beginning to peer around for our land and water, when I saw Aneguin ahead of me on a high hummock looking intently to the westward. Hastening forward, he showed me a long black streak on the western horizon, calling it an island. I looked, but saw what I called water, and so it proved upon getting my glasses. I saw the long, regular curve mentioned on

the 13th, and, perhaps, the same seen on the 11th. I certainly think it is the open ocean. As from our elevation our horizon could not exceed six miles, I feel satisfied that the edge of the ice must be within that distance, and as the point of the land came down in the middle of the water it is equally evident that we shall come to the water before reaching the land. As the land now bears S. 60° W. magnetic (about W. by S. true) we have been drifting a long distance to the southeast, or else we are very close to it, for a change of bearing of five points has occurred in fifty-two hours. We have not had wind enough during that time to make any very extensive drift, and our course has been steadily southwest. All things taken into consideration, therefore, I assume that we are near land and water, and I decide upon resuming our march after dinner, to head W. by S. directly for both. During dinner (1.40 to 2.20) we saw the moon for the first time, I think, in two months, and what was more satisfactory we saw a seal in a lead near us, and Mr. Collins shot him, while the dingy this time got him before he sunk. Upon resuming the march at 2.20, therefore, we headed W. by S. (true), and I directed Mr. Dunbar to take Aneguin with him and go ahead a prudent distance to see whether we were really approaching the open sea, without paying attention to the movements of the sleds. I was certain that Mr. Dunbar and Aneguin could go three miles while we were advancing half a mile, and from this three miles a better view could be obtained, and a more correct opinion formed as to its remoteness. If the water were only six miles off, going three miles toward it would permit a very accurate estimate of the remaining distance. Mr. Dunbar carried a rifle and ammunition and some pemmican.

By 5.50 A. M. we had advanced everything three quarters of a mile, and then had come to a smooth place for camping, the only suitable place except one at a much greater distance than I thought we could make in reasonable time. Camped therefore and very fortunately, for no sooner were the tents pitched than it commenced to rain steadily. The wind had backed to west northwest, the sky had become covered with clouds, generally in north and south lines.

The seal comes in splendidly for two things, — food, and grease for our leaking boots. Before camping I had Iversen break off from boat-hauling, and set to work on the preparation of pussy. Removing the backbone and blubber the meat was cut up into small pieces for convenience in stewing, and the amount, twenty lbs., proportionally divided among the five tents. A similar division was made of the blubber, so that I am sure each man got his share for his food and for greasing his boots. Extra alcohol for cooking (2 oz. of salt), and a potful of broken bread to each tent, — seemed to promise a good supper. At 7.15 A. M. we sat down in No. 1 tent to a simply delicious repast. After our long diet of pemmican the change alone was a luxury. We did not stand upon our ship ideas of hanging the seal up until the animal heat had departed, or keeping it for a few days. The seal was shot at 2.30, skinned at four, and eaten at seven, and we feel as if we had dined at Delmonico's. Our seven thirty-thirds of twenty lbs. were cut up in small lumps, boiled in water, three and one half ounces Liebig added, one pint bread crumbs added to that, and salt to the extent of one ounce, and for a feast I shall long remember it. No. 4 tried to fry their six thirty-thirds, and so very successfully that Melville says the taste was like fried oysters!

At 7.30 Mr. Dunbar and Aneguin returned, and I was informed of the result of their journey. They went about three and one half miles, and Mr. Dunbar says he thinks they were half way to the open water. He was raising it very fast, but the land remained as distant as ever,—that is, he could see nothing but the faint snow curve which we have seen all along. Evidently, then, the land is distant, and may be, after all, one of the Liakhoff Islands. But I thank God that our chances seem so good for a speedy getting afloat, and thus rendering comparatively easy our access to it. Piped down at nine A. M. Called all hands at six P. M.

Weather, curiously enough, bright and pleasant, though from the temperature (34° in the sun) one would expect our customary fog.

Under way at eight P. M. Had “a rocky road” ahead of us with some digging, and, though we crossed several leads, but one bridging had to be done.



The Loon.

CHAPTER XIV.

BENNETT ISLAND.

16 July — 5 August, 1881.

Nearer View of the Island. — A Narrow Escape from Drowning. — Open Water in Various Directions. — Crimson Snow. — Perplexing Views of the Island. — Land or Water? — Making for the Land. — Impassable Roads. — Needle Ice. — Walrus. — Rotten Ice. — Confusion of the Moving Ice. — Clear Weather and New Views. — Recourse to Boats. — Fearful Work. — The Constant Change of the Ice. — Drifting Away from the Island. — How Relief is called. — Sudden Discovery of a Cliff. — A Rush for the Island. — A Terrible Landing. — Taking Possession of Bennett Island. — Plan of Operation. — Assignment of Work. — Geological Foundation of the Island. — Tidal Observations. — Reconnoissance by Mr. Dunbar. — Coal on the Island. — Mr. Chipp sent on an Expedition. — Return of Mr. Dunbar. — His Report. — Disagreeable Weather. — Return of Mr. Chipp. — Record made for Deposit. — The Cold Storm. — Shooting of Dogs.

JULY 16th, *Saturday*. — By 12.30 A. M. we had made a good mile from our camp, and halted for dinner. The weather continued bright and pleasant, and a few cirrus clouds were all that could be observed. The island shows more plainly than yesterday, but no water could be seen. At two A. M. resumed our march, and advanced everything another good half a mile by 5.30 A. M. Here there was but a poor place to camp, and, as I was closely occupied with getting sights, I sent Mr. Dunbar ahead to choose a place. He informed me that a quarter of a mile ahead there was a good place, and that, though

there had been several leads open, they were now closed, and we might sled right over. I gave the order, therefore, to go ahead, and returned to my work of a Sumner. As I have to carry my instrument box on a dog sled, my movements and those of the sled do not correspond, and I generally have to send to the rear to get my box brought up, and keep by it during the interval between sights to prevent it getting out of my reach. Mr. Dunbar had gone ahead to get a good hummock to look for the water. Much time elapsed without Melville coming back for the second fleet, and I could not understand why. Finally I rushed ahead, with my sextant in one hand and my artificial horizon in the other, and at last found the cause of the delay; the ice had opened again, and left us in a fearful mess. The dog sleds had got over and discharged, but could not get back, and Melville was trying to get his two sleds out of the snarl in which he found himself. I saw we were in for a time, and so it was; for not until nine A. M. did we get all our traps into camp, requiring three hours for what we expected to do in one. However, we are consoled, for Mr. Collins shot a seal meanwhile, the dingy got him, and we have another luxurious supper ahead.

Previous to getting sights, I had a mishap which was annoying. Going to the top of a hummock to take a look at the land, Mr. Dunbar and I had to go out of the road and jump some rather wide openings. Going was all right, but jumping across a four foot opening the ice broke under me as I jumped, and I went into the water up to my neck. My clothes held me up for a moment, and Mr. Dunbar grabbed me by the hood, as he thought, but by the whiskers principally, as I realized, for he nearly took my head off. My knapsack was away to

the rear, and I sent Johnson back for it when I reached the dingy. However, I soon got dry clothes on, and, thanks to the bright sun, my wet ones were soon drying. By capsizing of a dog sled we lost 270 pounds of pemmican. Mr. Newcomb shot a bird new to us, — a Mollemokki. The event of the day, however, was the seal, — a fine, large, fat one, giving us food and boot grease. Not much less in importance was the appearance of a walrus, — the first one seen by us in a very, very long time. Though fired at and hit by Mr. Collins and Nindemann, he remained under water finally after many reappearances.

The land showed somewhat plainly to-day, but I could see no water. Mr. Dunbar thinks he saw it, about seven A. M., to the left of the land, but I do not think he was right.



Bennett Island as seen in the distance, July 19th.

Supper at 10.15 A. M. Our seal was simply delicious. As it was so late (11.05) when we had finished supper, I concluded to sit up for a meridian altitude, which, when obtained, gave me $76^{\circ} 41' N.$ for our latitude, agreeing fairly with my Sumner, roughly plotted as it was. I shall now work my first sight over, with this correct latitude, and see our exact position.

As we have started the lashings of No. 1 sled, and as, in anticipation of rough roads ahead, I have concluded to lighten its load anyhow, we have some work ahead of us before our next march, and shall probably make a late start; I therefore, on piping down at 11.15, ordered all hands to be called at eight P. M. Wind light northwest; barometer 30.40 at 40°; thermometer 31°; sky beginning to cover with cirrus and cirro-cumulus clouds.

Called all hands at eight P. M.; light west breeze, overcast sky; breakfasted at nine P. M. Chipp was discharged from the sick-list, and returned to duty. This relieves Melville, who now takes charge of the road and bridge making, in place of the doctor, who now becomes a reserve.

Set to work repairing and lightening Nos. 1 and 2 sleds. Sent Mr. Dunbar ahead to flag out, and upon his return he told me he had seen the water. I now was able to see it from a hummock alongside the camp, and it was to the *right* of the island. The island itself was much plainer in sight than ever. I am again in hopes that we have made another discovery.

Working my longitude over with correct latitude, I find we are in 76° 41' N., and 153° 30' E. Soundings, twenty-three fathoms — mud.

This brings me along to —

July 17th, Sunday, upon the arrival of which we promptly sat down to dinner. Turned to at one A. M., and started ahead, leaving Mr. Cole and a sled crew to finish lashing and bring on No. 4 sled. At two hundred yards from camp we had some bridging to do, and five hundred yards further some more serious. However, Melville managed it well, and Chipp lost no time in jumping things across, and we finally reached a

stretch of hard ice, over which we could make good time, so that, by 6.45 A. M., I am satisfied we had made one and a half miles good. We then halted and camped.

During our march, from the top of a hummock we saw the water to the right and left of the island, and on the right, through spaces between hummocks, we could see it continue for a short distance. Believing we were close to it Mr. Dunbar went ahead one and a half of his miles, and kept raising the water very fast. From his turning point, he says, he thinks the water about twice as far as he went, making its distance four and a half miles. After he returned we advanced half a mile more, so that, upon camping, we ought not to be more than four miles off. The land seemed as distant as ever. He says the ice is very much better, much of it being smooth and of last winter's growth, and thinks in two days we can reach the water. But we shall see.

To-day I saw some faint "crimson snow" and several pieces of muddy ice. A very curious seal trick came to light by my breaking through the ice. He had two holes leading from the sea connected by a covered way under the snow and thin crust. I suppose it was to give him a resort in case a bear headed him off. On the ice, by one hole, was a cavity in which the seal had lain and rubbed the shedding hair off his skin.

Supper at 7.45 A. M. Divine service at 8.30. Piped down at nine. Called all hands at six P. M.; breakfasted at seven P. M. Under way at eight P. M. About one quarter of a mile from the camp we came to our first opening in the ice, which, simple enough for the leading dog sled, became very difficult for the heavy sleds

and boats, because of a sudden widening. Two other leads beyond widened also, and altogether we had a very delicate amount of work, requiring much care and attention.

Anxious to see what Mr. Dunbar saw before camping, I hastened forward with him to the same high ridge at which he stopped, and which commanded a good view. Here, to my unpleasant surprise, I could see land enough, but no water; and though Mr. Dunbar averred he could see water with streaks of ice in it, I felt inclined to think it was an effect of refraction. After undergoing many kaleidoscopic changes, I began to believe it had settled into land and water, both. The whole back curve remained as a dim outline, but lower down there were apparently dark cliffs and snow patches, but infinitely less distinct and regular. The more I looked the more confused I became, and Mr. Dunbar was nonplussed. At one time I was ready to declare that nothing but ice extended to the land; at another, that the land was very distant, and that we were near an open ocean, with pieces of drifting ice; and again, that mirage had raised and inverted ice hummocks and small peaks, and that there was neither land nor water. This last I abandoned, however, because the light curve above had been too often seen and too well maintained its regularity to be an effect of refraction. I sat and studied this thing for an hour, watching every change carefully with a glass, and I finally made up my mind that part of the dark looking mass was land, but that the lower strata was certainly water. I decided, however, to send Dunbar and the doctor ahead after dinner, to look nearer and speak more surely. Turning back to see what kept Chipp and the boats behind, I learned of the serious ice-open-

ings, and, having got everything advanced a good three quarters of a mile since breaking camp, I halted at midnight and prepared for dinner. Just then Mr. Collins called out to me, "Captain, is that land or water?" Looking south, where he pointed, behold there were some more uncertainties. Was this land or water? If land, then we had seen no water west. If water, then our only land west was the faint curve drawn above and very distant. I was fairly staggered, and Mr. Dunbar looked as if he had been dropped from the clouds. It was a confusing moment to me. The south appearance indicated much greater distance, and if I made for it a S. E. wind might spring up and drift me away from it faster than I could go toward it, and I might, by going to the westward, reach the land or water before a southeaster set me away from it. I decided to await the result of the trip of Dunbar and the doctor.

July 18th, Monday.—At 12.50 A. M. ahead went those two gentlemen, and at 1.15 A. M. we moved along with our effects. After crossing two small leads we struck a long piece — two miles — of smooth ice, made last winter, and got along splendidly. Next to the smooth ice was a long floe of hard, older ice (two miles), and I was beginning to contemplate a good day's work when some unexpected openings occurred among the last winter's ice and threw us back somewhat, and, in consequence, when I halted and camped on the old ice at 5.40 A. M., I think we had barely made two miles good since our breakfast.

The weather had remained pleasant. The sun was frequently obscured, and enabled us to dispense from time to time with our snow-glasses, to the great relief of many who have difficulty in wearing them. Light west airs, the clouds having a slow motion from that direction.

At six A. M. the doctor and Mr. Dunbar returned. They had gone, they thought, four miles ahead of our dinner-camp, and from there had concluded they saw *no water at all, but all land*; and, though they could form no estimate of the distance of the land, they thought the ice extended to its base. This is slightly different from the "open water in two days," but it cannot be helped. After mature consideration, I have decided to keep on heading for the land for several days yet. From the manner in which we have raised it in two days, I hope it is less distant than supposed; and, as the appearance south can no longer be seen, it is evident that the land west is the nearer. *Chipp says he saw a similar appearance north this morning.*

If we can get on this land, we shall, at all events, know that we are stationary, and that the wind will not carry us around aimlessly. Unless the Liakhoff Islands are incorrectly charted, this land is not one of them, for the northern point on the chart is still south of west considerably of our position on the 16th. If there ever was open water north of these Liakhoff Islands, as stated by Wrangel, Anjou, and Hedenström, we may get to it from the south side of this land. "A bird in the hand is worth two in the bush," and I will head for what I can plainly see, instead of bearing away across a shifting sea of ice for something which I cannot see.

Supper at 6.30 A. M. Piped down at nine A. M. Called all hands at six P. M. Breakfasted at seven P. M. Bright and absolutely cloudless. Thermometer 31°. Temperature inside tent No. 6, 48.5°. Under way at eight P. M., and immediately had a stretch of three fourths of a mile, over good ice, bringing up at a lead two hundred yards wide. In this we secured a large

floe piece, and having everything on it by 10.15 P. M., we ferried across. Then we had a mile of splendid going over smooth ice, and when we halted for dinner at 12.30 A. M., —

July 19th, Tuesday, I am sure we had made one and three fourths miles good, over a west and north (true) course. The weather bright and sunny, a few cirro-cumulus clouds only having appeared in the northeast. The wind remained at south, and seemed inclined to freshen. The land was in plain sight, and though I was so puzzled yesterday, I am not satisfied yet that there is no water.

Turned to at 1.50 A. M. and went ahead. For two miles we had a good road, and then we came to a fearful mess of small ice lumps and water, with a rare large block. It was the kind of ice over which one might walk, but dragging anything was out of the question, while a boat would be knocked to pieces. Some fearful disturbance has occurred here at some time or other, and huge blocks have been reared up on end, and at all angles. Traveling looks something like this: —



In vain I climbed up several large hummocks and kept Mr. Dunbar running around in quest of a better place for crossing. Melville had already commenced the herculean task of digging away some of these huge slabs to level a road, in case we could manage the water-gaps, which seemed almost impossible, when the doctor said he had seen what he thought a better way of crossing farther to the northward. We hastened to the spot, and by some work and management, I think we can get across this mess and on the level ice beyond. But it was now six A. M. and our usual supper time, and we had made nearly four miles. The work of crossing would probably require three hours; so, instead of continuing at once, I decided to get supper first and proceed afterwards. I am too anxious to leave this mess behind us, to camp on this side of it, and though we have made a good three and one fourth miles already, I must keep the men at it for a little while longer. The barometer is falling rapidly, 29.95 at 44°, and though the temperature is 31°, I anticipate a S. E. wind, and do not want to lose the grip I almost feel I have on the land.

The action of the ice in formation is nicely shown by blocks of wasted (needle) ice, which we pick up and can pull in pieces. The doctor called my attention today to the distinct manner in which the hexagonal prisms were visible, and the vacuole, as well as the lines of successive freezing. The formation is like that of muriate of ammonia, or the basaltic columns in Fingal's Cave. The blocks can be easily separated, flake by flake, vertically, and at each freezing line horizontally. (See Appendix G.)

By 7.20 A. M. everything was up to the edge of the rotten pack, and we sat down as soon as possible to

supper. The sky remained nearly cloudless, and the sun shone brightly. As everybody was complaining of the heat, I exposed a thermometer to the sun, getting 35°. At 8.40 A. M. turned to and set to work, and from this time to three P. M. we had the hardest time we have had yet. Such a mess of loose cakes, rotten ice, water holes, and pack ice I have never seen. We tried everything, bridging, road-making, and finally, by means of rope, to join the moving mass together. Everything succeeded for a few moments, and then came to nothing; and it was only by rushes and jumps and risks that we got everything on solid ice and camped, — four and a quarter miles good. Towards noon clouds rose rapidly from the southward, and covered the sky so as to prevent my getting a latitude, which I very much desired. Called all hands at eleven P. M., and at midnight sat down to breakfast. Soundings in twenty-two and one half fathoms.

July 20th, Wednesday. — Hard as our work was last night I congratulate myself that it was not left till this morning, for we have a thick fog, which would have made our task an impossibility. Temperature 27°, due to the evaporation, for the pools on the ice show not the slightest sign of freezing. Found Foxy dead in the water. He probably had a fit and fell in.

Got under way at 1.30 A. M., and though our work was not so difficult as yesterday, it was still sufficiently trying, and by the time we had succeeded in getting all our things across the one half mile intervening between the hard ice on which we camped and the long level plain beyond, it was six A. M. and I decided to go no further. Tents were accordingly pitched and preparations made for supper. While loading the first detachment of sleds on a cake of ice for ferrying, we were surprised by see-

ing a walrus come up alongside us, and apparently intent upon getting on our cake too. Mr. Collins hurried along with his gun and fired at him, hitting him near the eye. Down went the walrus, and we thought we had seen the last of him. Soon after, however, we heard a sound of hard "blowing" to the northward of us, among the fearful mess of broken ice, and looking along in that direction, we could see large patches of blood on the ice where it had been ejected in breathing. The doctor at once set out on the hard ice to the west, and Mr. Collins on that to the east, while I sent Mr. Dunbar along to the scene. Soon I heard a shot and a cry for a rope, and then four more shots, and, in fine, we killed him and secured the game.

While the doctor was firing at him the walrus was in the water, and, no doubt, if he had been killed at once he would have sunk, but while stunned for a moment, Mr. Dunbar cut a hole in a flipper with a knife, and *rove* in it the doctor's belt, and then one more shot finished him. We hauled him down to camp. He was a young bull, from 1,200 to 1,500 pounds in weight, — more meat than we and the dogs can eat under the circumstances. The choice parts, tenderloin, sirloin, heart, liver, brain, and flippers, will more than suffice for three meals for us, and the dogs may eat all day if they like. The skin will be cut up into pieces and divided for boot soles. The tusks go to Mr. Collins, one of which he gave to the doctor. In the walrus's stomach there were shrimps and small fish like smelt, and numerous sea anemones or sea cucumbers(?).

Fog cleared away about four A. M., but weather remained cloudy and dull. No land in sight up to seven A. M.

We found our walrus stew excellent. It was not as

good as seal stew, the meat being coarser and not so sweet. We shall repeat for breakfast, and carry as much as we can conveniently in the dingy. Piped down at nine A. M. Called all hands at six P. M. Nothing visible on account of fog.

Breakfast should have been ready at seven P. M., but as both our supper and breakfast were cooked by burning blubber, much longer time was required, and it was not until 7.45 that we in No. 1 sat down to our meal. The saving in alcohol has been effected at the expense of time.

Under way at 8.30 P. M., and after advancing three quarters of a mile over our course, W. and S. (magnetic) we came to a broken and confused mass of water and ice, much resembling our recent serious experience, and here I halted the leading sleds. Two of our McClintock sleds had received some hard usage in our troublous trip over the "mess" on the 19th, and needed relashing, and the dingy sled was crippled, one runner being doubled under entirely. Ericksen's dog sled was also *hors de combat*, and much work was thus in readiness for Sweetman. This delayed us considerably, for I could not attempt to cross the rotten and ugly mess before us with crippled sleds, and I dared not leave anything behind me.

At eleven P. M. the wind had got to N. E. and commenced to blow. Rain fell also, and seemed likely to fall for some time. The ice in the opening (one quarter of a mile of lumps, hummocks, and floebergs) commenced moving, and I began to fear it was now impossible to cross. Altogether it was a dreary prospect. Everybody was getting wet. We could not advance over a living, moving, rotting pack, and the increasing wind promised a gale. So I concluded to pitch the tents where we were, as a shelter, and get dinner.

July 21st, Thursday. — At one A. M. the tents came along, and the cooking stoves, and while the cooks pitched camp and prepared dinner, Chipp took the rest of the men back and brought forward the dingy, with walrus meat enough for supper. At two A. M. dinner was ready, alcohol being used as fuel. Rain still continued in squalls, and the ice in front of us was moving before the moderate northeast gale. Clearly this was a case of a lost day, and I accepted the situation.

At 5.30 A. M. the land showed quite plainly between W. S. W. and a half W., and W. by N. Soundings in twenty-two fathoms, and a rapid drift W. S. W. (two points to right of leeward). Supper at seven A. M., and as our bags were the most comfortable things we had at our disposal, we in No. 1 crawled into them at eight A. M. Piped down at nine A. M. During the sleeping time the wind tore around our tents in fierce gusts, threatening to pull them out and whirl them away. Rain fell from time to time. Called all hands at six P. M. Breakfasted at seven P. M. Ice still moving in the lead. Land in plain sight, and much nearer too, extending from S. 87° W. to N. 56° W., both magnetic. Wind strong from east, but moderating somewhat.

The confusion before us was such that I dared not risk trying to cross anything. Large blocks, small lumps, and floebergs were moving along to the southward, and occasionally a large piece, seemingly free, would suddenly be shot up in the air as it was squeezed by larger ones, or its submerged portions became freed from overriding masses. If one of our sleds had been caught in such a predicament, or one of our boats, the result would not be doubtful. The wind seemed inclined to freshen again, and going ahead was out of the question. A quarter of a mile of this living, moving ice would hold a Goliath back.

Looking further north we saw the most promising place yet, which seemingly offered an easy transit across the narrowest part of this ice channel. Sending Mr. Dunbar ahead to pick out the road, I hurried back to bring up the sleds, and at 9.35 P. M. we commenced our first forward movement. Some little pick-axe work gave us a fairly good road, though three jams were threatening to relax and leave water gaps every movement. In fact, hardly had we got the boats through than one of them opened. Meanwhile, a cold fog had shut us in and hidden the island from our sight.

July 22d, Friday. — As but one sled or one boat could be hauled at one time through the passageway above described, it was one A. M. before our last boat was through, and we halted for dinner. We were on a good piece of hard ice, lumpy, but giving fair traveling. This was separated from a much larger piece of hard, old, smooth ice by another ugly mess, which we could get over if it held together; but it was threatening to open at any moment.

Before dinner I had sent Melville forward to cut a road, which was done, and by great good fortune at 2.20 A. M., when we turned to, we got everything through without trouble. Before us there lay a mile of excellent going, which we took so well that at 5.45 A. M., when I pitched camp, I felt satisfied that two miles might be scored as made good from our starting-point at 9.35 P. M. yesterday.

Dunbar and I had gone half a mile further ahead on hard, smooth ice (after passing a ridge at which we camped), and were then brought to a stand by some more confused mess, across and beyond which the fog prevented us from seeing. Though we might have

gone as far as this before camping, I preferred to have a clear stretch at first for our next move, hoping to see the land meanwhile, and perhaps change our course to more favorable ice. Saw several murre, one loon, and many gulls. Walrus meat again for supper, and then, except his flippers, we have eaten all the choice parts. Our dogs have literally gorged themselves on the remainder, and some of them are too fat for comfort.

We are, thank heaven, rid of the wet, slushy travel which tried us so long. So many holes have been made through the ice, either old seal-holes or places where mud has collected, that the surface snow in melting has drained off, leaving good, fine, hard traveling. Our only enemy now is an ice-opening, and unfortunately this occurs frequently.

Piped down at nine A. M. ; called all hands at six P. M. The sun shining brightly, though much fog around the horizon prevented us from seeing the land. Under way at 8.10 P. M., and made good time over the mile of smooth ice which lay before us. At the end of this mile we came to some trouble ; a mess of loose pack, fifty feet in width, and some rough ice beyond, separated us from hard ice one quarter of a mile distant. However, we made a flying bridge, or ferry rather, and by 12.10 A. M.,

July 23d, Saturday, had everything across in safety on the hard ice, and halted for dinner. Turned to at 1.20 A. M. and went ahead. The fog seemed inclined to lift, and we could see a point showing which, from its bearing N. 40° W. (magnetic), I judged to be the point which yesterday bore N. 56° W. (magnetic). Shaped a course to carry us to the left of it. We came to some good hard ice again after crossing one bad mess, and I hurried along a good mile and a half to a

high ridge, to watch with Mr. Dunbar the reappearance of the land. Upon the ridge we began to see a headland working out from the fog, and bearing N. 84° W. (magnetic), and apparently good ice leading to it. Almost calm at four. At 5.40 A. M. halted and camped, having, I consider, made an advance of two and a half miles west northwest since breaking camp yesterday evening.

The fog now *almost* uncovered the island and enabled me to determine that the land was one island and not two, as I for some time supposed. The bearings of its extreme points were S. 82° W. and N. 27° W., both magnetic. Other bearings will appear in the sketch which I have directed Mr. Collins to make. I do not think it is now five miles distant, and a long, low point of land, sloping to the ice, I think somewhat nearer. Magnificent weather, calm and cloudless, save for a few streaks of cirro-stratus clouds. Sufficient mist and fog rest over the top of the land to hide whatever is in the background; but several have said they saw high rolling land back from the cliffs, which are shown in the sketch. Broiling hot sun, though the thermometer reads 27° . Got a Sumner, and determined our position to be in latitude N. $76^{\circ} 40'$, longitude E. $151^{\circ} 25'$, a change of position since the 16th of twenty-eight and a half miles to S. 88° W. Soundings, twenty and a half fathoms; rapid drift to westward.

Piped down at nine A. M., but I remained up until noon to get a meridian altitude; latitude resulting $76^{\circ} 39' 15''$. So my Sumner was very nearly exact. In fact we are drawing in so rapidly upon the land all the time that I dare say my Sumner is quite exact. Called all hands at six P. M.; under way at eight P. M. Bright, nearly cloudless weather; an appearance of land to the southwest.

Before getting under way got fresh bearings. The extreme points were found to bear as follows: S. 87° W. and N. 18° W., both magnetic, and the low point at which I headed, west (magnetic). Though the weather was bright and pleasant, a fog-bank was in the eastern horizon and threatened to advance upon us. In order to give this new island a chance to see the "Stars and Stripes" before the fog shut in, our colors were displayed.

For one and three quarters of a mile we advanced over a good road, and then came to an opening with large and small blocks of ice, but yet water enough to permit a ferry. The ice was all in motion, and as everything might change favorably before we were ready to cross, no useless labor was indulged in by getting ready bridges or ferrying pieces. At 11.50 P. M. all our sleds and boats were up. At ten the fog had covered us and shut in the land, while an easterly breeze sprang up that changed our sensations from those of uncomfortable



Bennett Island, Discovered by Captain De Long and Party.

heat to those of uncomfortable cold, though probably the temperature remained unchanged.

July 24th, Sunday. — At 12.20 A. M. we sat down to dinner by the opened ice. Some little excitement was created by the appearance of a seal, which Mr. Collins killed; but it sank before the dingy could reach it, and thus our luxurious supper faded away. At 12.50 A. M. turned to; the ice had been alternately moving east and west during dinner, but had now subsided, leaving a lane fifty yards wide of clear water between us and a neighboring hard floe. I at once decided this to be a case for floating boats, and as soon as I had run a line across in the dingy, and Mr. Dunbar had secured its end, the boats were in turn drawn over. The first cutter upon arrival was emptied, and used to ferry dogs, dog sleds, and loose packages, and in one and a quarter hours everything was across, then we proceeded for a short distance three quarters of a mile, and were again confronted by an ice freshet. Large blocks were being swirled around and carried first west and then east; leads were opening and closing every moment; water lanes opened now, where a moment before a good road appeared, and such a state of activity as we have not before seen. Beyond this lay a stretch of good hard ice, and better than that a lead of water on our course west (magnetic), and fifty to one hundred feet wide, while extending as far as the fog would permit us to see, which, it is true, was not far. But the sliding, shifting mess, before alluded to, bothered us exceedingly; though there were three dog-sled trips for each sled, and four trips for the men, a new way had to be found each time, going and returning, and it was not until 6.40 A. M. we got all things over and camped. Mr. Collins, however, at 6.30 shot a seal, and we know

that to-morrow we shall have a seal for supper. The land showed just once, about 5 A. M., and we are seemingly quite close to our point. It still bears west, but hardly had we seen it than down shut the fog thicker than ever.

Supper at 7.30. Divine service at 8.30. Piped down at nine A. M. Immediately after a cry was raised "a bear," and away rushed three or four in pursuit. We soon heard two shots, but at 9.45 A. M. all returned without any game. The natives fired at about one thousand yards, but rather wildly, I imagine. Bruin is described as not very large, (sour grapes?) and of a dirty brown color.

As I was very tired upon turning in, I at first slept very soundly; but towards morning (*i. e.* evening) I became wakeful. During one of these breaks, I heard two shots fired at some distance. Supposing it to be another wild goose chase, I paid no attention to it, and resumed my sleep; but at six P. M., when Mr. Cole called all hands, I learned that at four P. M. Görtz had killed a bear. Bruin came within five hundred yards of the camp, and Görtz crawled within one hundred yards of him unnoticed, and planted his two bullets with good results.

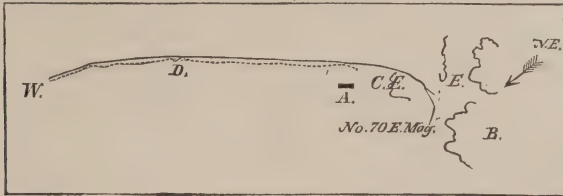
Fog still continues. Light airs from east. Temperature 28°. What lovely weather for the last week in July! Breakfast at seven P. M. Under way at eight P. M. Start fleet where lead bent to west. Go down it in dingy. Lead closes. Much trouble. Strike hard ice finally, but much difficulty in getting gear up to it. Succeed by 12.45 A. M.

July 25th, Monday. — Sent Dunbar ahead, across an ugly mess. He and doctor go together. Strike hard ice, and at its edge they see low point, through fog,

one eighth mile distant, bearing west. Turn to at 1.45 A. M. Very ugly time crossing mess. Little or nothing accomplished in distance by six A. M., our usual supper time. Conclude to work all night. Land suddenly shows plainly, and we seem about one mile from it. Moss plainly seen on the face of the cliffs. Go ahead at eight A. M., and from that time to noon, frightful work: ice opening, swirling, swinging us off from land, separating our things in spite of us. Rain sets in and continues in showers. Get our things together and dine at 12.45 P. M. Getting our reckoning straight at the expense of rest. Under canvas to avoid rain. Apparently we are drawing into a bay making an indentation on south side of island. Rain ceases. Turn to at two P. M.; go ahead. Simply fearful work which I can never forget, and ending at six P. M. in a fog which hid everything. Got on a piece of good ice and pitched camp. Bear meat for supper. Twenty-four hours since we commenced work. Wind S. E. Temperature 30.5°. Tired, cold, wet, hungry, sleepy, disappointed, and disgusted; but ready to tackle it again to-morrow. Piped down at nine P. M. This affords me a chance to return to our natural way of living, working by day and sleeping at night.

July 26th, Tuesday. — During the night I was frequently awake, and could hear the wind getting up, and occasionally the rain pattered down. As I gave everybody a good long rest, it was eight A. M. before all hands were called. I then found a northeast gale blowing, a thick fog, and only unsatisfactory glimpses of the land now and then obtainable. The ice to the eastward of us was all in motion, and much water and drift-ice pieces lay between us and the land. Several of the watch declared that during the night, when they saw

the land, it was much nearer than when we camped ; and Mr. Collins, who turned out during the night, said we were in front of the valley, and he could see clear water between us and an ice-foot, or strip of ice next the land. The situation I think is as follows : —



- | | |
|-----------------------------------|---|
| A. Our position. | B. Ice rapidly drifting to S. W. before wind. |
| E. East end of south side island. | C. Water and drift pieces. |
| W. West end of south side island. | D. Ice-foot or strip of fast ice. |

I think we are far enough under the lee of the point east to escape drifting with the ice pressing down along the island, and passing the point east, even if we are not in an eddy so created, and thus pushed in closer to the land. As nothing can be seen clearly, it would be folly to move into a probably endless confusion, and I shall therefore wait until some plan can be safely carried out.

I do not think I shall ever forget yesterday. Such a time of difficulty and vexation can be experienced nowhere else. Such a shifting of ice and opening of leads ! Hardly had we commenced to move our things along what seemed a fair road, than the road broke up ; ice broke under us, ice slid away from us, ice moved to the right, when we wanted to go to the left, and *vice versa*, and each installment of provisions got safely across was considered by me as barely rescued from destruction. And all this time the land, not one half mile off, was tempting us by its solidity, and appealing to our desire for rest by its moss-covered hills and slopes.

At eight A. M. yesterday, when we concluded to go on, and worked for twenty-four hours, so many good roads, each leading seemingly directly on shore, presented themselves, that I was embarrassed in a choice. In fifteen minutes they had fallen to pieces, and became puzzling masses of ice and water. There was no question that when I gave it up at six P. M., everybody was used up, and could not possibly have gone further. Everybody was wet up to his knees, stiff legs and cramps annoyed us until we had been an hour or two in our bags, and we were too tired, in fact, to get the rest we stood so much in need of. However, we are all right again this morning, and none the worse off, better off, in fact, for if we had not put in the twenty-four hours in full, we should have been out in the heavy drift ice, and probably miles away from the land by the time this gale is over.

At noon the fog broke away and showed the land for a few moments. We were exactly as I had supposed and indicated by the sketch on the preceding page. The pressure of the ice in swinging off the east point has backed us in toward the bay, and between our floe and the land there is about two miles of water nearly clear of ice. Jammed against our floe are a number of large blocks and hummocks, offering serious difficulty to any attempt to launch our boats. On the off side of these hummocks the sea is breaking considerably. The wind tears around us in fierce gusts. No. 6 tent has been twice blown down. We shall see what the state of affairs is after dinner. Dined at 12.30 P. M. luxuriously on bear stew.

By 1.30 the land was again in fog, and otherwise the situation was as before. My desire was to go ahead, but prudence told me to wait until the weather moder-

ated. The barometer is still falling, the rain beats down from time to time, and nothing can be seen through the fog. I decide to wait for an improvement, and then I shall push on in the second cutter and try to land some provisions.

Soundings in thirteen fathoms; no drift indicated. Our ice is evidently jammed tight. Probably at the first chance the loose hummocks now pressing against it will slack off and leave us place to launch our boats, even if our floe piece does not go bodily in toward the land.

During the afternoon the ice scene was constantly changing. At one moment ice seemed to reach from our floe to the land; at another time lanes of water were seen, and once our floe was left as an island, while it would have been possible to launch a boat and reach the shore. I confess I was tempted to try it, but I realized that the whaleboat could carry nothing more than her crew safely until her garboards were repaired, and that it would take six or seven trips of the two other boats to carry our effects. The whaleboat has leaked badly each time she has been floated, and the weather to-day (the first chance for repairs) has been such that Sweetman could not handle his tools. Before I could have got one boat in the water ice shoved in between us and the land, and we were once more helpless. It seems as if Providence were directing our movements, for the floe upon which we camped last night is the only large piece of ice to be seen; all else is confusion and trouble. Had I gone farther, or stopped short of this place, it is hard to say where we should be now.

We are moving west slowly, about a mile or a mile and a half from the land, and are now (seven P. M.)

abreast a large glacier, whose broken edge (it may be twenty feet high) we can see with a glass. I have watched carefully all day for a landing-place, but not one has shown. The coast is either steep cliff or glacier, and neither is a successful landing-place. The barometer is now at a stand, — I think 29.63 at 33°, — and, though rain is occasionally falling, and the sky is dark and threatening where the fog does not hide it altogether, I am in hopes the weather will improve during the night. Supper (bear stew) at six P. M. Piped down at nine.

July 27th, Wednesday. — Called all hands at six. Breakfasted at seven. The wind has veered to E., and is dying away. A thick fog continues, hiding everything fifty yards distant. The barometer is rising, — 29.67 at 36°, the temperature is 28.5°, from which two things I anticipate clearing weather. Meanwhile, we remain where we are. “Hope deferred maketh the heart sick.” Patiently and hopefully have I waited all the forenoon for a clearing, but still, at one P. M., does the fog hang about us impenetrably. The barometer still goes up (29.72 at 38°), and the temperature is 30°.

Soundings in sixteen fathoms water, and I am afraid we have drifted down abreast the point west, and are too far west to hope for any benefit from the bay in which yesterday we shoaled our water to thirteen fathoms, in which case we are now beginning to open the west face of the island. This will be the last forlorn hope for open water in this neighborhood.

And yet there is much to be thankful for; everybody is in excellent health, in spite of our terribly hard work; the appetites are something wonderful to think of, and our sleep is sound and unbroken. Forty-one days of

our march over the frozen sea have had no bad effect. Our bear is so nearly consumed that for supper we have only half our usual ration to serve out. (In five meals we have eaten about 250 pounds bear meat. The gross weight was probably 450 pounds.) The only trace our marching shows on us is tender feet, and that probably arises from their being so often wet. Wading through pools would make wet feet if our foot gear was changed every hour.

Chipp described to me the queer way in which the man on watch "calls" his relief. Instead of calling him, which would wake everybody else up, or of crawling over to him, which would also awaken everybody, a boat-hook is employed. Chipp says, while awake the other night he saw, to his amazement, a boat-hook slowly coming through his tent door, and poising a moment over Sharvell, poke him vigorously in the back. To show how soundly the man slept, it is worthy of mention that he merely tried to brush it away, as a troublesome fly. This ought to make a good Arctic sketch.

At six P. M. had supper. At 6.45 the fog lifted a little, and showed us the land, seemingly about half a mile off. We have drifted along shore since last evening, and have left on our right hand the glacier which we were in front of last night; but ahead of us, and apparently extending in to the land, was a very heavy floe of blue ice, separated from us by a few insignificant openings. Such a chance was not to be lost. All hands were at once turned to, and at 7.15 we went ahead with all four sleds, officers dragging also, and then bounced along the boats, and in one hour we had everything on the heavy floe. This we now found to be one and one half miles in width upon going over it,

and we were still separated from the land by a half mile of broken ice, water lanes, etc. I at once made up my mind that it could not be done to-night, and that I had better devote a day to it.

The wind had veered to E. S. E., was blowing fresh, and rain began to fall steadily, and when, at 10.45 P. M., just inside the blue floe edge, I gave the order to camp, I think I did a very prudent and sensible thing.

July 28th, Thursday. — Called all hands at seven. Breakfasted at eight. Windy (E. S. E), foggy, and disagreeable. Land in sight at times. We have gone a short distance to westward. Temperature 29°. Under way at 8.50 A. M. Sent Mr. Dunbar ahead, and after a while we succeeded in crossing the broken ice which had stopped us last night. Here we had a small floe, across which we speeded. The fog now shut in impenetrably, and I feared we were in for a troublesome time. Mr. Dunbar returned, however, and informed me, that after crossing this floe we should find large ice blocks, with only two-foot openings, and that these extended to the ice-foot, or fast ice, and that, moreover, he had climbed up on the ice-foot, and advanced one hundred yards over it toward the land. This was too good a chance to lose, and away we went. But though we made all haste, and got over our last ferry, and across the small floe in splendid time, when we reached the further edge we found everything fallen to pieces, and more water and rapidly moving ice than we could undertake. Much of the moving ice looked like small bergs broken off from a glacier foot, and from the rounded lumps of ice on top, and their almost straight edges, I am inclined to think they were icebergs. By 12.30 P. M. we had everything up to the floe edge, and halted for dinner.

The sun now tried to break through the fog, and I hoped for a clearing; but at 1.30 P. M., when we turned to, the fog was as thick as ever. The situation had improved somewhat, for another floe piece had now come along, and a few loose pieces offered a convenient bridge. Away we went, but the floe piece was a small one, and we soon reached its edge. Here was another confusion, but we could make out a larger floe ahead. Everything was embarked on an ice-cake for a ferry-boat, and a hauling line run to the floe. By great effort we got our piece clear by four P. M. and commenced to haul over. Suddenly everybody gave a shout, "Look!" Away up over our heads 2,500 (?) feet towered the land, and we were sweeping past it like a mill-stream. Hurriedly sounded in eighteen and one half fathoms. Soon our floe was reached. Away we jumped our sleds and boats, and, seeing two or three large cakes nearly together, ran everything rapidly over until we at last stood at the base of the ice-cap. It was a narrow squeeze, for the men with the tents and remaining loose provisions on their shoulders had hard work to run fast enough to get on the last cake before the other cakes were swept away. Now that we were on the last cake our situation became critical. We could not get up on the ice-foot, for ten feet of water and small lumps intervened, and we were sweeping along by it at the rate of three miles an hour. Our cake was none of the strongest, and in the swirling and running masses, and small bergs, I feared we should be broken up and separated. It was an anxious moment. The southwest cape of the island was not half a mile away, and this was our last chance. Over two weeks of dragging and working to reach this island seemed about to be thrown away. I soon noticed our cake begin

to turn around, and saw that it might be whirled into a kind of corner against the fast ice, where, if it remained long enough, a landing might be effected. "Stand by," was the order now, and with sled ropes in hand we waited the trying moment. Soon our cake caught and held. "Now is the time, Chipp!" I shouted, and away we went.

One sled got over on the rough ice-foot all right; a second nearly fell overboard; the third *did* fall overboard, dragging in Cole; and a piece of ice had to be dragged in by sheer force to bridge for the fourth. When I started the St. Michael's sleds, they seemed to stick somewhere. Watching our cake closely, I saw signs of its giving way. "Away with the boats!" — but how? Nindemann sang out, that he thought we could float the boats below, and haul them over. No sooner said than done, and down they went into the water. The men were hurried from the sleds to the boats, and I saw the first cutter just beginning to haul out, when away swept our ice-cake, carrying Melville, Iversen, Aneguin, and myself, with six dogs. Wilson had carried one load of dogs over in the dingy, but he could not get back for the remainder. Chipp was on the ice-foot with the boats, and I knew he could look out for them, and I felt pretty certain we had saved everything. For ourselves, on the drifting ice-cake, I had some little anxiety, but one corner of our cake fortunately soon after drifted near a fast berg, and by making a flying leap through the air, we escaped in safety. At last! But though standing still, we were not ashore. The ice-foot extended out from the land, and was a confused mass of piled up ice-blocks and ridges, — honey-combed, cracked, and broken, — and presenting a simply impassable road for travel with sleds. Glad



LANDING ON BENNETT ISLAND

enough was I to get a solid foothold anywhere, and I gave the order to camp at 6.30 P. M. (our first sled having got on the ice-foot about five), everything being hauled in as near to the land as possible, say fifty feet from it. Rocks were occasionally slipping down and falling into a little stream of water at the foot of the cliff, the stream being where the thawing of surface ice has left a channel about four feet deep.

The face of the cliff was literally alive with doves. Supper at 7.30 P. M. At 8.30 P. M. all hands were called to muster and, led by me, everybody waded, or jumped, or ferried over to the land, where we held on as well as we could to the steep slopes of débris, while our colors were displayed. When all had gathered around me, I said, "I have to announce to you that this island, towards which we have been struggling for more than two weeks, is newly discovered land. I therefore take possession of it in the name of the President of the United States, and name it Bennett Island. I now call upon you to give three cheers." And never were three more lusty cheers given. With great kindness three were then given for me.

I now change the date to the correct one, and record that at 8.30 P. M.,

July 29th, Friday, I added Bennett Island to American soil. Our landing cape I name Cape Emma. Piped down at nine P. M.; fresh E. wind, thick fog; ice off shore rapidly moving west. The birds kept up a fearful chattering all night, but we slept well in spite of it.

July 30th, Saturday (correct dates hereafter). — Called all hands at seven. Breakfasted at eight, and at nine A. M. turned to. Our plan of operations for our stay was put into execution as follows: —

Chipp, Nindemann, Ericksen, Lee, Bartlett—Tidal observers.

Collins — Sketches, and general collection of facts.

Newcomb — Natural History, Flora and Fauna.

Dr. Ambler — Geological work, and collection of facts.

Dunbar — Looking for game, etc.

De Long — Astronomical observations, barometer, compass variations.

Crew generally — Getting murre's eggs, drift-wood, flowers, and other specimens.

Before noon I had received moss, scurvy grass, grass, tufa, lava, cryolite (?), yellow flowers (curious differences in these flowers), *amethysts*; and in the afternoon I received from Mr. Dunbar two eggs of murre's, large as hens' eggs, and spotted. And at three P. M. Johnson brought in a piece of reindeer horn with moss on it. Dunbar made a small collection of drift-wood, but saw no way of getting a lodgment on the island, and no signs of game. Latitude at noon $76^{\circ} 38' 17''$ N. Barometer 29.80. Temperature 31° .

During the forenoon the tide was ebbing, and though the wind was W., the ice was driving along to the westward at a great rate. Large floes brought up against our ice-foot for a moment with a jar that caused it to tremble, but it stood firm, and the floes split and broke and swept along. The pressure was tremendous.

The collections are coming in so rapidly that I can but just notice them by a word. Melville found a *vein of bituminous coal*, and brought a large lump. Doctor found down from some fox or rabbit, also rock tripe, mosses, and more flowers; nine dozen murre's and dove-kies brought in up to four P. M. Drift-wood accumulating. One piece chipped with an axe at lower end like a fence-post; another burned on end. We

have already collected enough fire-wood for two meals, and with a coal-mine "handy by," and birds in thousands, we need never want for a warm meal.

The geological formation of Bennett Island is thus described by Dr. Ambler: "It is certainly of volcanic origin. It is composed of trap-rock: a species of feldspathic rock, igneous rock with silica caught up in it in masses; trap-rock with globules of silica; trap-rock containing globules, which rock being broken shows the globules of the darker color sticking in the matrix, while the portion of the mass knocked off will show a complete mould or bed. The globules are about the size of a pea, receive a bright polish from the finger, and are soft enough to be cut with a knife; silica, very light stone, tufa, I think, of a light brown color, spongy in appearance, as if blown up by gases; lava of different colors, varying from a yellowish brown to a dark green; clays almost the color of bricks; débris from the sides of the cliff being disintegrated portions of this red seemingly baked clay.

"The face of the cliff (Cape Emma) is in six terraces of igneous rock, separated by other strata imposed, of the red clay stuff which contains most of the silica. The amethyst was found in a matrix of quartz imbedded in the trap-rock. The stalagmite and stalactite were found upon breaking open a mass of trap-rock, found lying on the beach, and could be easily removed by the finger. The stratification is horizontal; fossils seen. There is also a white stone with very much the appearance of gypsum. There are two varieties, one occurring in tabular masses, with glistening sides when held in the light, and the other of a dull, opaque white, and in rounded masses which show the action of water. Both varieties can be cut with a knife, and form an

opaque white powder, which effervesces upon applying nitric and acetic acids."

The bituminous coal is abundant, and burns readily. Melville thinks it has from fifty to sixty per cent. carbon, but to-morrow he will experiment further, and I will note his remarks.

Unfortunately, the forenoon and afternoon were both cloudy and foggy, and I could get neither time sight nor azimuth. A landslide occurred at 6.30 P. M., large masses of rock and red clay being hurled down from the summit of Cape Emma.

From our observations of tides to-day, it would seem that the flood comes from the westward. Birds for supper at seven P. M.

Measured the water at various distances from the foot of the cliff, — 50 feet, 7 feet deep; 100 feet, 12 feet deep; 150 feet, 16 feet deep; 200 feet, 28 feet. Our ice-foot is kept in by grounded floe pieces, or bergs broken off from the foot of the glacier on the south face. Wind very light; northeast airs; barometer at nine P. M. 29.84 at 37°; temperature 30°. The tide measurements were made by a pike-end stick (a paddle with a chisel end) stuck in the bottom ice, and held in rigidly against the face of a rocky cliff (Rudder Point). The graduations are to inches, — half inches, and quarter inches, being estimated by the observers. The first reading was taken at 10.26 A. M. by my watch, and subsequent readings hourly.¹

July 31st, Sunday. — Called all hands at seven. Weather cold and foggy. Mr. Dunbar having expressed a wish to go along the south side of the island, and it agreeing with my desire to know more of that section, I this morning gave him permission to take

¹ For this and subsequent measurements see Appendix H.

Alexey, Aneguin, five dogs, and a dog sled, and remain away forty-eight hours for that purpose. He will start after dinner, carrying provisions, lime juice, sleeping bags, knapsacks, arms, and ammunition, and a compass, glass, and measuring line. I have instructed him to take all possible bearings and sketches, and if he is able to get up a hill-side to look carefully southwest for land. At two P. M. he started, to be back by or before noon on Tuesday, August 2d.

The bird-hunters were out again this afternoon, but with rather poor luck. They barely got enough for supper. The birds are becoming shy, and at the first rock hove down from above fly out in clouds and keep on the wing. Hundreds and perhaps thousands remain in the niches and crevices, but they are out of reach and out of sight. Melville experimented with the coal to-day, using a stove built of stones. The fire burned until choked with its own ashes. The result gave fifty per cent. of combustible matter, though of course we could make no quantitative analysis. The shale and slate burned with it, giving forth a gas like coal gas, or petroleun gas. No sulphur evident. The coal was merely the out-croppings of a vein extending down the mountain side abreast the camp, and picked off easily; and further back, or deeper, the coal was no doubt better. Hematite, from which brown metallic paint is made, was also found.

Dinner at one, supper at 7.30. All three meals to-day have been of murre, old and young. Delicious food! For a change from stew, our ordinary way of cooking, we in No. 1 had them fried for supper in bear's fat, and a more luxurious meal I do not recollect having had. I must here note that our water supply is obtained from streams running down the mountain side, sweet and fresh.

At 8.30 P. M. read divine service ; at nine piped down.

August 1st, Monday. — Called all hands at six. Breakfasted at seven. Wind W., light. Upon mature consideration I have decided to send Chipp with the second cutter and six men to have a look at the west side of the island. Upon walking out to the Rookery yesterday, I saw a more distant cape through the fog, and bearing N. 31° E. (magnetic), Rudder Point bearing S. 10° W. (magnetic), and Ericksen and Kaack walked out to it and said it was only three miles distant. The ice-foot breaks off, however, just beyond Rudder Point, and a stretch of water takes its place, making in to some little amount of beach. Beyond the distant cape Ericksen said the land trended more to the eastward and was lower, and I am of the opinion that if Chipp is successful with bearings and soundings on his journey we can make a very fair chart of the island. Mr. Collins accompanies Chipp to make sketches, etc.

At ten the party started, all hands dragging the second cutter along beyond the Rookery ; but upon arrival near the edge of the fast ice, instead of the stretch of water along shore, the broken pack was jammed in close. Chipp here halted his party to wait for a change, while the rest of us returned to camp. I sent Mr. Newcomb out this morning to see what effect ten shot cartridges would have on the birds. Before noon he had got forty, but the birds were extremely shy, and he could not command a choice of position from his perch on the dizzy cliffs. He had a narrow escape after firing his last shot, — a large piece of cliff tumbled from the place he had barely left. We dined at twelve on pemmican, reserving the birds for supper.

Except supper the night of our arrival, and breakfast

the following morning, all our meals have been cooked with drift-wood. Chipp carries a gallon of alcohol with him, but he will of course avail himself of any drift-wood. Dunbar depends entirely on wood, because he will not leave the land-ice.

Weather at noon still overcast and foggy, but I am in hopes of a clearing. I must get a longitude before leaving. Thursday, the 4th of August, is the day I appoint for our start toward the Siberian Islands. Calm. Temperature 29°. Sent out a party after dinner to bring in the fire-wood which Ericksen and Kaack piled up yesterday. The men sent out to bring back the wood report that Chipp had just started afloat with the second cutter. Newcomb came back at eight P. M. with quite a collection.

August 2d, Tuesday. — Called all hands at six; breakfasted at seven; pemmican, etc. After breakfast sent out some bird-catchers. At ten A. M. Mr. Dunbar returned. From his report, verbally made, he has been about fourteen miles along the south face. He brought back some mosses, stones, and drift-wood, and an old bone which may have been that of a musk ox (?) or of a walrus. No game of any kind was seen, but traces of bears, foxes, Arctic hares (?), and grouse (?) were found; bear-tracks and a bear's winter house, divided into outer and inner apartments at right angles, Arctic hare (?) wool, grouse droppings. The extinct volcano, which we saw to our right before landing, and which I supposed to be at the shore, was three quarters of a mile back and about four and a half miles from our encampment. He saw two glaciers, and thinks they unite at the top. The further and larger was three miles across its face, and its edge was from fifty to sixty feet in height. This is the glacier abreast of

which we were on the 26th, and upon which it would have been impossible to land. It certainly looked tempting then.

Three hours after leaving camp he came to a valley through which a stream of water flowed. It was here that he found the musk ox (?) horn and a track of a bear. Here the ice-foot ended, and he took to the beach, but finding the shore becoming bold and steep, also, he came back half a mile and camped. He encountered at this place a large amount of drift-wood, a great mass of it sticking out of the earth like a dock fallen to decay. A hundred feet above the sea-level, and five hundred feet up the slope, was more of this drift-wood, probably carried there in the course of years by the gradual upheaval of the land. Next morning, August 1st, he left the sled and gear, and started with Aneguin and Alexey, and the dogs, to try to cross the mountain. After ascending about one thousand feet (at which point he picked up some marine shells) he was shut in by thick fog and soon after returned. He next attempted to cross the foot of the big glacier, but after going about three miles was obliged to give it up. He found cracks in the glacier one foot wide, but widening below, and he could hear the roar of water several hundred feet beneath him. Large patches of crimson snow were abundant on the ice-foot.

A N. W. gale has sprung up during the forenoon, and is blowing the ice off shore, where the land ice ends beyond the Rookery. Much water is consequently between us and the pack west and southwest, and Nindemann reports that from the Rookery he could see large lanes of water making to the southwest, and the ice was constantly separating to form new ones. Chipp ought to come back flying at this rate.

Weather cold and very disagreeable. It is impossible to keep warm, and my feet have nearly frozen. Thick clouds are flying rapidly over the sky, and those people who have not seen nimbus clouds in the Arctic ought to be here to see the rain clouds and the ragged threatening edges they show. I would like very much to get the height of this bluff in front of which we are camped. But though it is variously estimated from 1,800 to 2,500 feet, my sextant measurements only make it 300, and I shrewdly suspect that my sextant is nearer right than wrong. It is so positively dangerous to attempt to climb on account of the rottenness of the cliff, that if a man slipped he would inevitably break the barometer if not his neck. Aneguin had a narrow escape yesterday with Mr. Dunbar; climbing a cliff after a bird, he slipped, and after sliding rapidly toward destruction, just barely caught with his nails and fingers as he was about going over a precipice to the glacier sixty feet below.

The bird-hunters were unable to get a single bird, and in consequence we had our last birds for supper. Drift-wood enough was brought in to cook to-morrow, and enough remains behind to last one day more. During the evening rain fell occasionally. The wind still blew a gale, and though we were somewhat protected fierce gusts took us, threatening to blow our tents away. The doctor is quite sick. The birds have not agreed with him, and pains, etc., are the consequence. Piped down at nine P. M. Though I have marked the wind N. W. it is possible that sweeping around these points may constantly change its direction. The wind may be much different from what I marked it, though judging by the clouds it is N. W.

August 3d, Wednesday. — Called all hands at six; breakfasted at seven. Strong wind yet from N. W., with mist, fog, and occasional rain. Clear water for two miles off shore southwest, ice beyond. Barometer, 29.73 at 36°; temperature 28°. At 9.13 A. M., this morning, high water. Bartlett noticed that the highest tide-mark on the rock was one foot higher than the 3' 1" on our gauge. Of course it must be remembered that the zero of our scale is where it is stuck in the bottom ice.

At 12.30 P. M. Chipp returned, having been some seventeen miles along the coast. He brought back many stones, mosses, and some eggs, and Mr. Collins made some excellent sketches. But as Chipp kept a good diary he can hereafter make me a detailed report and I need not itemize here.

The weather during the day has been simply disgusting. Fog, rain, or mist as wet as rain, snow-hail, — cold and sharp gusts of wind. At six the wind was W.; barometer 29.68 at 36°; temperature 28°. Too foggy to see whether ice or water is next our ice-foot.

August 4th, Thursday. — This is the day which I appointed for leaving, but it is ordered otherwise. During the night the wind increased to a gale again, and upon calling all hands at six A. M. we found ourselves shut in by fog, while a pitiless storm of rain, snow, and hail beat down upon us. Seaward nothing can be seen, but whatever there may be the weather is unfit to expose a dog even; the wind where we are is about W. N. W.

Filled out one of our blank records to be left behind, in the following words: —

BENNETT ISLAND, CAPE EMMA.

Lat. N. $76^{\circ} 38'$, Long. E.

August 4, 1881.

This island was discovered on the 11th of July and landed upon, taken possession of and named on the 29th of July by the officers and men of the U. S. Arctic Steamer Jeannette, which vessel was sunk by the ice on the 13th of June, 1881, in latitude N. $77^{\circ} 15'$ and longitude E. $155^{\circ} 0'$.

It is my intention to proceed from here at the first opportunity toward the New Siberian Islands, and thence toward the settlements on the Lena River. We have three boats, thirty days' provisions, twenty-three dogs, and sufficient clothing, and are moreover in excellent health. We drifted in the pack ice from the 5th September, 1879, to the date at which our vessel was crushed and sunk by the ice, and during that time discovered two islands, Jeannette Island and Henrietta Island, upon the latter of which a party landed. Jeannette Island, discovered May 21, 1881, is in latitude N. $76^{\circ} 47'$, longitude E. $158^{\circ} 56'$, and Henrietta Island, discovered May 25, 1881, is in latitude N. $77^{\circ} 8'$ and longitude E. $157^{\circ} 45'$. Excepting these islands we saw no land since losing sight of Herald Island in March, 1880. Having rested here a few days, we are now detained by a westerly gale, fog, sleet, and snow, and though at times we see much open water to the southwest we cannot yet say whether or not we can take to our boats to resume our journey, or shall be forced to resort again to dragging everything over the ice. The ice travel has been very hard, and two miles a day made good has been our usual distance, though many trips back and forth have been necessary on account of our weights. The ice in this sea is similar to the ancient ice encountered by the British Expedition of 1875, north of Cape Joseph Henry. We have lost none of our original number, eight officers and twenty-five men, and have not had scurvy.

GEORGE W. DE LONG, *Lieutenant U. S. N.*
Commanding U. S. Arctic Expedition.

I do not remember ever to have passed a more dis-

agreeable and uncomfortable day. Outside the tents the wind blew in such fierce gusts that it was hard to keep one's footing on the small pieces of ice left to us, while the driving snow and hail made it impossible to remain exposed. Inside the tents was wet and cold and dreary. Packed close as we were, all moving around inside was out of the question, and our feet were seemingly freezing all the time. Beating them on our ice-floor only made them ache, and using sticks as a bastinado, though making our feet tingle, hardly added to our comfort. We could do nothing but sit and take it, brightening up a little when hot coffee at dinner and hot tea at supper thawed us somewhat.

At seven P. M. the barometer had fallen to 29.55, at 34°, and was apparently on the stand, so I hope we may have a change by to-morrow morning. A prolonged delay here, unless followed by open water, would be a serious thing for us. It would seem that I am not to get a time sight while here, for not once have I had an opportunity.

The gale has loosened much of the rotten rock on the cliff abreast our camp, and during the day frequent showers of dirt and stones have fallen. Last night a terrific amount shot down and threatened to bury us. No. 2 tent turned out to a man, but the rest of us took it quietly. In fact, after our experiences, we are prepared for everything and surprised at nothing.

August 5th, Friday. — Called all hands at six A. M. Breakfasted at seven A. M. Wind moderating somewhat, apparently W. Barometer 29.57 at 34°. Temperature 28°. The clouds seemed inclined to break away, and the sun threatened to show through, but though I watched carefully during the forenoon, there was no chance to get a time sight, such a mist, or rain

or snow fell all the time, that my sextant and artificial horizon were useless, from the streams of moisture on their glasses. Sent Mr. Dunbar to deposit our record in a cairn one mile east from Cape Emma.

I, this afternoon, was forced to have shot ten of our poorest dogs, including Tom and Jim. We have now twelve left: Prince, SMIKE, Snoozer, Armstrong, Dick, Pilgarlic, Geyotack, Magalan, Kasmatka, etc. The amount of food these ten dogs eat is not compensated for by the work done, and I must think of human life first. The dogs were all worn out or subject to fits.

The sun showed about 4.45, and I got fair sights, giving longitude E. $148^{\circ} 20'$, the best I can do under the circumstances.

There is a berg outside of us aground in five fathoms, probably thirty feet out of water; sixty feet would be height of glacier foot. Barometer rising at eight P. M. 29.63, at 34° . Temperature 28° . We start tomorrow.

CHAPTER XV.

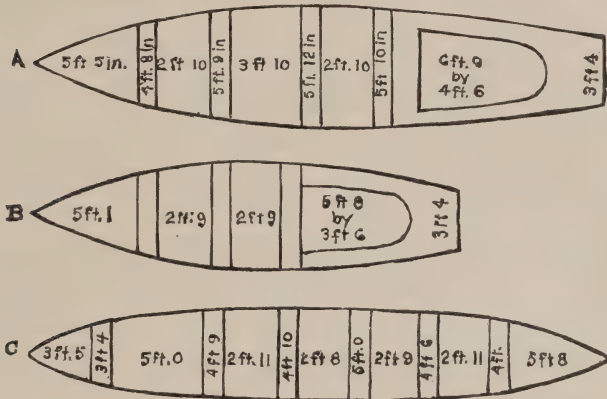
IN THE BOATS.

6—30 *August*, 1881.

Leaving Bennett Island. — The Island Disappearing from Sight. — Loading the Boats. — Orders to Mr. Melville. — Reduction of Luggage. — Loss of Dogs. — Two only Remain. — Following Leads. — Inventory of Provisions. — Snow-Storm. — Camping on the Ice. — Appearance of Land. — Shut In. — The Last Ration of Bread. — A Good Run. — Fog. — Preparations for Open Water. — Distribution of Effects. — Instructions to Mr. Chipp and Mr. Melville. — Wearisome Waiting. — Dependence on Tobacco. — Between Two Islands. — The Ice Breaking Up. — Shoal Water. — Land.

AUGUST 6th, *Saturday*. — Called all hands at six. Breakfasted at seven. A gale of wind from N. W. Snow squalls. Bright sunshine in spots, and generally a queer day. Barometer 29.70 at 32°. Temperature 27°. Mountain side covered with snow. Excellent time azimuth obtained, to be worked out hereafter. Turned to at eight, and immediately commenced preparations for departure. At 9.30 I started with the first cutter full of goods and chattels, and sailed across two miles of water before reaching the hard ice on the other side. Then sent the boat back under oars, and in like manner the second cutter and whaleboat as they arrived; but each boat had to make two trips, and it was not until 2.45 P. M. that the last boat towing the dingy reached the ice, and Bennett Island was left behind us for a full due. I had dinner all ready and

we sat down. Turned to at 3.30, and immediately commenced loading the sleds. When we started in the first cutter the wind had already moderated to a fresh breeze, and by the time I had landed on the ice it had almost died away. Then succeeded the rarest of things in the Arctic — a perfect day. Bright sunshine, almost



The Jeannette's Boats.

A. First Cutter, Captain De Long. B. Second Cutter, Mr. Chipp. C. Whaleboat, Mr. Melville.

cloudless, and a burning heat, 27°. The island came out of the fog in all its beauty, every line, every snow-curve sharp against the sky. I immediately set Mr. Collins to work making a sketch.

Upon landing on the ice I saw a water-lane making around on each side, and upon investigation I found we were on a large ice island, and that beyond we had a large expanse of water; accordingly I determined to sail the boats around while Mr. Chipp dragged the sleds across. This we did, carrying in each boat sleeping and cooking gear, knapsacks, etc. The first cutter was manned by the doctor, Mr. Collins, Lee, and myself; the second cutter by Mr. Dunbar, Starr, and Kuehne, and the whaleboat by Mr. Melville and Mr. Newcomb,

Mr. Danenhower going as a passenger. We were successful in getting the boats around before six P. M., while the four sleds and dingy did not get across until 7.35 P. M. Camped and got supper ready. Light N. W. airs. Barometer 29.83, at 37°. Temperature 27° in the sun, 25° in the shade. Piped down at ten P. M. Cape Emma was certainly five miles off, — a good day's work.

August 7th, Sunday. — Called all hands at six. Breakfasted at seven. Wind W. Barometer 29.80, at 38°. Temperature 24°. Our usual fog seemed creeping up from the southwest. The top of the island was already swimming in the clouds. As a result of the low temperature of last night, much young ice formed; close to the floes it was one eighth of an inch thick.

A careful look to the S. S. W. showed that with some care we could probably make a mile or two with the boats, but with sleds we could not make a mile in a month. Numerous leads and much broken ice presented insuperable difficulties. Accordingly I determined to make the attempt, and the three boats were loaded to their utmost capacity.

FIRST CUTTER.	SECOND CUTTER.	WHALEBOAT.
De Long,	Chipp,	Melville,
Ambler,	Dunbar,	Danenhower,
Collins,	Sweetman,	Newcomb,
Nindemann,	Sharvell,	Cole,
Erickson,	Kuehne,	Bartlett,
Kaack,	Starr,	Aneguin,
Boyd,	Manson,	Wilson,
Alexey,	Warren,	Lauterbach,
Lee,	Johnson,	Tong Sing,
Noros,	Ah Sam.	Leach.
Dressler,		
Görtz,		
Iversen.		

FIRST CUTTER.	1 dog.	10 sleeping bags.
765 lbs. pemmican.	Bread.	Second cutter sled.
35 gals. alcohol.	Sugar.	10 gals. lime juice.
Liebig.	Tea.	WHALEBOAT.
Boat box.	Coffee.	Pemmican.
4 tin cases.	2 tents.	Alcohol.
1 chart case.	2 stoves.	Liebig.
1 calculation box.	SECOND CUTTER.	Boat box.
3 boxes specimens.	540 lbs. pemmican.	2 guns.
5 guns.	8 gals. alcohol.	10 knapsacks.
13 knapsacks.	6 lbs. Liebig.	10 sleeping-bags.
Sleeping bags.	1 boat box.	Whaleboat sled.
1 cutter sled.	4 guns.	4 dogs.
No. 1 sled.	10 knapsacks.	

At nine A. M., all being ready, we got under way. The dingy was taken in tow with Ericksen in charge of seven dogs. But four jumped from the boat afterwards and did not rejoin us, so that at noon we had only eight dogs remaining of our twelve.

Proceeded under oars, pulling four at a time in the first cutter. This gave us two watches of pullers, for Lee was sent to the dingy afterward as a steady hand, and after breaking through the new ice got into water, and by 12 30 P. M. had certainly made three miles good on a S. S. W. course. The fog now surrounded us, and we had come to a floe island, the water around which was choked at each side. There seemed nothing left but dragging sleds and boats over, and I meanwhile called a halt for dinner

We had left behind us two St. Michael's sleds and four McClintock sleds, — no longer of use to us except as firewood, and the dingy had two days' allowance of that, counting her as fuel likewise. These sleds had done good work, but our traveling now was beyond even their capacity.

Turned to at 1.30 P. M., and I saw a chance to get around to the left of the floe island. Started ahead, but just as I got the first cutter to a narrow opening in the before closed ice neck, the ice came together with a snap and stopped me. Turned back to our dinner place and discharged the boats, and loaded the provisions on the four sleds. Then we all (except Danenhower) took hold at three P. M., and in one fleet dragged the sleds across the floe island. By this time the ice neck to the right had opened, and I was able to pull the boats around to where the sleds were, and again loaded up. Proceeded again on a general S. S. W. course, and, upon coming to a closed place, unloaded, carried things along on our shoulders, dragged boats over, reloaded and resumed our journey, — making by 5.30 P. M., when I camped, a distance of two miles more, or five miles for a day's work.

Wind S. S. W. Temperature 28°. Hard floe for camp. No further progress possible to-night, but a promise for to-morrow.

COPY OF ORDER TO MELVILLE.

U. S. ARCTIC EXPEDITION.

CAPE EMMA, BENNETT ISLAND,

Lat. 76° 38' N., Long. 148° 20', E.

August 5th, 1831.

P. A. Engineer GEO. W. MELVILLE, *U. S. Navy* :

SIR, — We shall leave this island to-morrow, steering a course (over ice or through water, as the case may be) south magnetic. In the event of our embarking in our boats at any time after the start, you are hereby ordered to take command of the whaleboat until such time as I relieve you from that duty, or assign you to some other.

Every person under my command at this time, who may be embarked in that boat at any time, is under your charge, and subject to your orders, — and you are to exercise all care and

diligence for their preservation and the safety of the boat. You will, under all circumstances, keep close to the boat in which I shall embark, but if, unfortunately, we become separated, you will make the best of your way south until you make the coast of Siberia, and follow it along to the westward as far as the Lena River. This river is the destination of our party, and without delay you will, in case of separation, ascend the Lena to a Russian settlement from which you can communicate, or be forwarded with your party to some place of security and easy access. If the boat in which I am embarked is separated from the two other boats, you will at once place yourself under the orders of Lieut. C. W. Chipp, and, so long as you remain in company, obey such orders as he may give you.

Respectfully,

GEORGE W. DE LONG,
Commanding U. S. Arctic Expedition.

At 8.30 called all hands to muster. Read Articles of War, and then performed divine service. Piped down at nine. Soundings in twenty fathoms.

August 8th, Monday. — Called all hands at six. Breakfasted at seven. Wind S. S. W. Temperature 28°. Turned to at eight and commenced to drag the sleds and boats across the floe to a lead on the south side.

I then went ahead, and by 11.50 had, perhaps, made one half mile. Stopped for dinner. Most of our work was dragging, though we had a little boating. At 1.10 turned to and went down a lead one mile, and then were stopped. Cape Emma in sight, bearing N. N. W. Distance ten miles. At three halted. After hauling our boats out and having an impassable dragging road ahead of us, waited for a probable opening. Disappointed, and dragged along everything a little further to some hard ice, when at five we halted to get supper. Mr. Collins got a seal, and Dunbar shot three murre.

Cut up the McClintock dingy for fire-wood. After supper I could find no chance to go ahead, and I therefore determined to pipe down and make an early start in the morning. We had broiled seal and a taste of murre apiece for supper. We then set to work reducing our luggage to a small compass. Got rid of our knapsacks, and put all our clothing together in bags. This reduces the number of packages, and materially assists us in stowing the first cutter. Supper at six. Turn to at 7.30. Shoot Prince and Pilgarlic. Lose Smike, Armstrong, Wolf, Dick. Two miles by 9.30. Halt and camp. Coffee giving out. Tea for dinner instead.

August 9th, Tuesday. — Called all hands at five A. M. Breakfasted at six A. M. Turned to at seven. Temperature 26°. Loaded up sleds, and dragged them and the boats about one quarter of a mile over the ice, and then were able to float the boats. Nearly caught the first cutter between two closing pieces of ice. Short fleet, then drag again, and at 11.30 had made good south about two miles. Halted for dinner. Twenty fathoms. Turned to at 12.30 P. M., floated boats, and then, by a miraculous piece of good fortune, were able with one hitch to make a good five-mile stretch afloat. The hitch occurred by the closing in of a narrow opening through which I was desirous of pushing the boats. Five minutes earlier and the opening would have served us, but just as we got up the chance was gone. The ice seemed about to close also astern of us, and we had to make a very lively scramble up the side of a big floe, and throw our provisions out with all speed. Then the whaleboat's people had to lend us a hand to drag our boat up this steep incline, which was a hard job. However, it was done, and we proceeded, and when the

time for supper came, 6 P. M., I considered we had made good seven miles to the southward. This is too immense not to glory in, when I remember the hard days of dragging which only gave one and a half or two miles.

Sat down to supper at six P. M. on a hard ice floe, letting our loaded boats ride alongside. It was my desire to keep the twelve dogs we had on leaving Bennett Island, and if we could possibly carry them to bring them with us to the end. But on Sunday, when we were starting, four of them jumped from the boats, and time was too precious to stop and run after them. To-day four more, Smike, J. Armstrong, Wolf, and Dick, did the same thing, and though their doleful howling could be heard long after we had stopped for dinner, I could not spare the time to chase them even if the crowded condition of our boats would have permitted their being carried. But as our boats are so heavily loaded that the slightest motion causes the water to wash in through the rowlocks, carrying dogs becomes a risk. Perhaps the most sensible thing would have been to shoot them all, but, with the island so near, I thought if they escaped from us they might get back and perchance live. So that chance for life was given them.

To-night, however, after carrying four dogs in the first cutter, I came to the conclusion that I was wrong so to lumber up the boat, and much to my regret (and to Ericksen's grief) Prince was one of the two victims led off to execution. Pilgarlic was the other. We now have two of our original forty, — Snoozer and Kasmatka, — and these two I shall keep until it becomes perilous to do so.

Got under way again at 7.30, and by 9.30 P. M. had

made two miles more, when I came alongside a hard floe. Unloaded and hauled up boats and camped. Coffee is getting so low that I shall be compelled after to-morrow's dinner to use tea at that meal and supper both. Nine miles to-day.

August 10th, Wednesday. — Called all hands at six. Breakfasted at seven. Calm. At eight turned to, loaded boats, and at 8.30 got under way. Worked along to the southward under oars, and a light N. E. breeze springing up made sail. At ten brought up by a large amount of ice blocking up a lead, and had to land on the hard floe, discharge and haul up boats, and drag everything one half of a mile "overland" to get afloat again. At 11.30 came to alongside hard ice and got dinner. Three miles made good for forenoon's work. At 12.45 P. M. got under way again, but lost half an hour by getting in and then getting out of a choked lead. N. E. wind increasing. Snow falling steadily. At 3.30 apparently came to the end of the large lead, and ran alongside of hard ice to reconnoitre, and let people run around to get their feet warm. Found that by going northwest a bit I could keep away again. Got under way at 3.45, and had such a glorious run by 5.30 that I seized upon the first large ice-island I met to come to for supper.

Nine miles this afternoon, or twelve miles good between breakfast and supper. Foggy, and steady snow. Bennett Island not seen to-day. Pitched tents for shelter during supper. Much open water. Large leads. Ice broken up into islands.

Turned to at seven and got under way, and thanks to a freshening N. E. breeze had made five miles more by nine P. M., at which time we were stopped by a choked lead separating us from a large water space, and being

well enough satisfied with seventeen miles for a day's work, unloaded and camped.

August 11th, Thursday.— Called all hands at six. Breakfasted at seven. Wind E. N. E. Barometer 30.08 at 32°. Temperature 26°. Turned to at eight. The lead still remaining choked we were forced to carry all our traps about three hundred yards along the ice, and we then floated and loaded our boats. Under way at 8.40, and proceeded until 11.45, by which time with oars and sail we had made seven miles. Came to alongside a floe for dinner. Much thin young ice close in to the heavy floes, the growth of the night. Saw an oogook. Dunbar fired at him but missed.

Turned to at one P. M. and proceeded. Sun occasionally showing through clouds and fog, but I generally steered by the wind, keeping it on our port beam, or a little abaft it. Consequently we made a course generally between south southeast and south southwest.

To save all time and distance, I cut off all the corners I could in steering through the ice, and occasionally crowded through some very narrow places, using pick-axe, and jumping out to lighten boat when she grounded on projecting tongues. Once this afternoon was obliged to turn back and "go west" for a time. In consequence I think we did not make more than nine miles by 5.45, when I ran alongside a drifting floeberg for supper. Mr. Collins here shot a seal, which we shall have for breakfast. Turned to at seven and proceeded, but after going beautifully south for one and a half hours, were caught in a trap and obliged to go northwest for one half hour before keeping away. Snow now began to fall, and at 9.30 P. M. ran alongside a floe piece, unloaded and hauled up boats, and camped. Ran since supper four miles on our course, —

Breakfast to dinner	7 miles.
Dinner to supper	9 miles.
Supper to camp	4 miles.
Total,	<u>20 miles.</u>

Wind E. Temperature 26°.

August 12th, Friday. — Called all hands at six. Breakfasted at seven (seal). Turned to at eight and launched and loaded the boats. At 8.20 started ahead and was forced to steer to the westward, and making for two and a half hours about west southwest, then I was able to haul up more to the southward, and made about a south southwest course until twelve, when I ran alongside a floe for dinner. Here we were seemingly brought up by a closed lead, and I did not think we had made more than four miles altogether. Bennett Island showed plainly, its ice-cap towering up like a dome, bearing north northeast, distance forty (?) miles. Until I get sights again I cannot tell how far it may be off. From our experience in underestimating distances when going toward Bennett Island, we may now have fallen into the habit of overestimating. Turned to at 1.15, and after breaking through a kind of Suez Canal, got into a large opening which unfortunately soon terminated, bringing us up against a solid floe. I walked ahead while the sleds were being loaded and the boats hauled up, and seeing a possible chance of resuming our journey afloat, if only a little ice would slack off, I kept everything fast from 2.20 to three, when, seeing nothing gained, we went to work dragging our sleds and boats a half mile "overland," reaching a narrow lane of water at that point. We went south about two miles, when we were stopped by jammed up blocks of ice. It was no use to attempt such work, and at six went alongside a hard floe, unloaded and hauled

up boats, and had supper. At 7.30, the situation remaining unchanged, went into camp.

August 13th, Saturday. — Called all hands at five. Breakfasted at six o'clock. Calm. Crooked lead opened somewhat during the night. Bennett Island, Cape Emma bearing N. 12° E. (magnetic.) Turned to at seven. Under way at 7.15, and by poling, hauling, and dragging got boats along five miles southwest, and then by 11.20 A. M. was forced to come to alongside a small floe piece, unload, and haul out. We were effectually stopped. The continuance of calm prevents any movement of ice, and all around us it lies in closely massed blocks over which there is no sledding, and among which there is no boating. Not a lane can be seen, and not a single large floe, and until a breeze springs up and opens the ice we must wait. Dinner at twelve. Strong appearance of land to south and southwest, and cumulus clouds indicating water.

During the afternoon the sun came out brightly, and gave us a long-wished for chance to get our wet clothing and sleeping-bags dry. Light south air came along occasionally, but the ice remained closed. Toward five P. M. I thought there might be a change, and I ordered supper to be got ready. At 6.30 packed up ready for a start. Temperature 24°, though it has got as high as 32° in the sun at three P. M. At 7.10 got under way, and proceeded about a mile southwest, but was then brought up. Having a hard floe at hand, ran alongside it, unloaded and hauled up boats. Fog setting in with light southeast breeze.

PROVISIONS ON HAND.

65½ lbs. bread (4 days).	46 lbs. sugar (11 days).
43½ lbs. ham.	18½ lbs. coffee (9 days).
74½ lbs. tea (36 days).	20 lbs. beef tongue.

14½ lbs. pigs' feet.	1,600 lbs. pemmican (38 days).
24 lbs. beef extract (23 days).	53 gals. alcohol (26 days).
	5 gals. lime juice (20 days).

August 14th, Sunday. — Called all hands at five. Breakfasted at six. Wind S. E. Temperature 27°. Turned to at 6.50, and launched and loaded the boats. Started ahead at 7.10 and proceeded, making about a west southwest course. We were terribly bothered with young ice, which was found to the thickness of one fourth inch, and had to be beaten down with boat-hooks and oars before we could force the boats through. Then all the twists and turns we had to make consumed time, and though we sailed, pulled, and tracked our boats until eleven A. M., I do not think we made more than two miles. At eleven we could advance no further, and I ran the boats into a sunken dock and got dinner ready.

During dinner the wind backed to N. E. and freshened, and the ice seemed inclined to open. Pushed ahead at 12.40, and by 2.40 had made about one mile southwest when we were again brought up standing. I now hauled up the boats and pitched the tents. The snow was falling so thickly, and the wind blowing so freshly, that remaining exposed to it was imprudent. I could see no chance to go ahead. Sent Mr. Dunbar across our floe to the south, and he came back at four, saying three quarters of a mile south he saw a lead making south, and one quarter of a mile wide.

The storm increased, and I concluded to defer moving until morning. Supper at six; divine service at seven; piped down at eight.

August 15th, Monday. — Called all hands at five. Breakfasted at six. Wind N. E.; temperature 26.5°. The wind had moderated considerably, but snow was

falling in thick flakes. Some sign of a good lead showing to the westward, I sent Mr. Dunbar out to look at it, and upon his return he reported that it trended to the northward. Nothing remained therefore but to drag everything across the floe to where the lead was seen yesterday P. M. At 7.15 we commenced, and it was a fearful job. The ice was very much wasted, and had numerous holes extending through to the sea. So much snow had fallen during the night that these holes were covered by it, and the first warning any one had was his going in up to the waist. However we got across by going a crooked, roundabout track, but it was 10.15 before we got our boats floated, loaded, and ready to start. Then we were much bothered with new ice and the thick sludge which the snow had made, and at one time I had to resort to hard tracking. But at twelve, when I came to for dinner, I considered we were two miles south of where we started after breakfast. While waiting for dinner Mr. Dunbar shot a seal, which not only gives us a good supper but also provides the two dogs with a meal. At 1.15 went ahead again. During the forenoon I had been much bothered by the sun not showing, and the wind suddenly shifting from N. E. to S. E. But during the afternoon the sun showed occasionally, and I was able to keep a knowledge of our course.

There was very little water indeed, so little in fact, and so much young ice, as to make me more anxious than I care to show or to record. With our provisions running low, and no islands or open sea in sight, each day finds me more and more anxious. Over two months of this care and anxiety is very wearing.

By six P. M., when we stopped for supper, I think we had added three miles south to our day's work.

Cooking seal meat with blubber consumed much time, and it was not until eight P. M. that we were under way again. The wind had now got to east, and the ice commenced to open quite rapidly, sometimes to south, sometimes to west. By ten P. M. we had advanced south two miles, and as the fog prevented me from seeing anything I hauled alongside a large floe and unloaded and camped. Temperature 26° .

August 16th, Tuesday. — Called all hands at six. Breakfasted at seven. Wind N. E.; temperature 25.5° . Loaded the boats and got under way at 8.15, but had hard luck. First, I was compelled to go to the northward to get in a lead running to the southwest, and then with all our crooks and turns I do not think we had made two miles southwest by eleven A. M., when we were brought to a stand. From the highest hummock we could command, but few patches of water could be seen, and no lanes at all. The ice seemed all ready to fall in pieces, but N. E. winds held it jammed closely. I got the latitude at noon, $76^{\circ} 2'$, and we were not so far south as I had hoped. Bennett Island, Cape Emma, being in $76^{\circ} 38'$, we are only $36'$ south of it, and as for longitude I can only say it bore N. 12° E. on the 13th, when we saw it last. We are probably not much over forty miles away from it. At one P. M. made another start, and struggled along southwest for perhaps a mile, when at four P. M. we were again stopped. Hoping for a change of wind to the N. W. I have done what I considered a proper thing, that is, waited. If I attempt sledding I shall probably lose some of our provisions by sleds getting overboard in this skeleton pack. Before supper I hoped for a change after supper, but after supper no change for the better had occurred. The wind had backed to N. and snow

was falling thick ; no water which we could use was in sight, and I therefore ordered the boats unloaded and hauled out. We prepared for another night in our wet bags, and hoped for a change on the morrow. Day's work : three miles southwest (?) ; sounding, nineteen and a half fathoms.

August 17th, Wednesday. — Called all hands at five. Breakfasted at six ; calm and light west air. Under way at 7.15, and by 11.30 had made about six miles good, on a southwest course, out of eight miles sailed. Here we encountered a large floe, and hoping a narrow vein of water running around it would widen, we got dinner. By 12.45 P. M. it had widened, and we proceeded at such a good rate that by 5.30 P. M. I think we had made six miles more good (southwest). Instead of the closely packed ice of yesterday, everything seemed to have fallen apart by magic, and a light S. W. wind was rapidly opening things before us. Saw an oogook on the ice. Mr. Collins fired twice but missed him. Seals plentiful in the neighborhood of our supper place. Shots frequent, but no results. To the south, appearance of land and fog and open water ; soundings in sixteen fathoms. Under way again at 7.15, and till 9.30 made three miles good southwest. Total made good for day fifteen miles (southwest). Camped.

August 18th, Thursday. — Called all hands at five. Breakfasted at six. Calm ; temperature 25°. Before starting out a seal was shot and secured. Under way at 7.10, but had such hard luck that by 9.30 we had made only one mile west. Young ice bothered us very much, and though we broke it through with poles our progress was necessarily slow. I tried tracking the boats, but that was no better. One man fell in the water through the treacherous snow-crust and got wet

up to his shoulders. Two openings that I tried to get through closed just as I got my bow entered, and I had to back out hurriedly. The ice was moving to and fro in no definite direction, and seemingly under great pressure. At 9.30 I was regularly brought to a stand, and at ten we commenced to get our seal dinner ready. At 11.30 dined. The clouds broke away a little, and a light N. W. breeze sprang up. At 12.30 P. M. made a fresh start, the ice opening up rapidly before increasing wind; strange to say the openings were west southwest and southeast. I took the first named.

To my surprise, the openings were closing rapidly, and the ice was in violent motion. Twice I narrowly escaped leading everybody into a trap. When we could finally keep away to southwest, it was only for a short time; and, though we ran along merrily before the strong breeze, we had made only six miles southwest by five P. M., when the water came to an end and I had to come to. The wind now freshened to a gale, thick snow fell, the barometer was at 29.52 at 31°, and the temperature 25°, and, wisely or not as the future will show, I decided to remain where we were for the night. No water which we could use was in sight, and sledding is yet out of the question; and, though God knows I am anxious to proceed, I do not see how I can.

Our last ration of bread was served out to-night. Since two days ago our ration of Liebig has been reduced to half an ounce per diem. Since Friday we have coffee at breakfast only, and tea the other meals. Dismounted No. 1 sled to carry inside.

August 19th, Friday. — The wind howled and tore around us until long after midnight. The ice was moving rapidly by our floe, and the second cutter's and

whaleboat's men had to turn out and shift their tents farther back. Called all hands at five. Breakfasted at six. Light N. W. breeze. Temperature 27°. Under way at 7.10, and by twelve had made ten miles on a south course good. At 9.20 we had come to so much open water that I believed the sea was close at hand. With a view of keeping under way all day, and perhaps all night, I ran the three boats alongside a floe to lay in a supply of snow for cooking. This took twenty minutes or so, but we soon made it up in pulling and sailing. The wind was freshening a little, and we were going at about two and a half miles an hour. One of our sleds (No. 1) was dismantled and carried inside the boat, and the other was carried in the bows; so we had none of the wearisome towing and impossible steering of yesterday. Chipp's sled was dismantled and laid across the stern of the second cutter, Melville's being across the bow of the whaleboat. I instructed the boats to keep close to me, and away we went. Commenced getting dinner in our boats, going under sail alone while so doing, and at twelve, just as we were sitting down to dinner, I saw the second cutter lower her sail and the crew hurriedly unload the boat. We had just come through a somewhat narrow passage between small floes, and I supposed it had narrowed too much to let the boat through. I rounded to, and directed the whaleboat to do the same, and we secured to a floe and finished dinner. The wind had now veered to N. E., and ice seemed to come down upon us on all sides. I could not get back to Chipp to help him without being caught, and he could not get to me. From noon to three P. M. he seemed to be continually loading, unloading, dragging over ice, tracking, and poling, so it was only upon his joining me at 3.30 that I learned the trouble.

The ice had closed on him, and, seriously enough, had stove a hole in the cutter's port bow. He at once dragged the boat out and repaired her with a piece of Liebig box. When we stopped for snow I had a sounding taken, and we got nine fathoms water. I naturally supposed we were near the land, and that the everlasting fog alone prevented us from seeing it. At noon I got the lead down again and found fifteen fathoms, so I must choose between a wrong sounding (touching an ice-tongue) or the discovery of a shoal.

I before remarked that the ice seemed to come around us like magic, and that it was moving and swirling about as if in a tideway. As we proceeded, the wind veered to the east, and we found ourselves working among loose streams of drift ice, through which at times we could see the open ocean beyond.

The streams obliged us to make a course about south southeast, and to south and southwest pack edge could be made out, the ice behind it being closely packed together. By 7.30 we had made about six miles good, our boats making so much leeway as to force us to steer much higher than I wanted to go. At that time I could see no land, though our view was exceedingly limited. But the sky looked very ugly, and our further progress might, in our loaded condition, be exceedingly risky.

The second cutter had taken in a large quantity of water and needed emptying, and if we were at the open sea, as I believed, material changes and reductions ought to be made in the stowage of all the boats. Accordingly I ran alongside the pack, unloaded, hauled out, and camped. Hardly had I done so than an east gale broke upon us, and it raged all the evening. Temperature 26°. Soundings in fourteen and a half fathoms (sandy bottom).

August 20th, Saturday. — Called all hands at five. Breakfasted at six. Turned to at seven. Wind fresh, gale from east. Temperature 27°. Immediately upon turning to, commenced making our preparations for sea. This involved overhauling the boats, cutting up sleds, melting snow for water, distributing provisions, and making lists.

The things carried in each boat appear below.

SECOND CUTTER.

1 mast and sail.	8 sq. ft. cedar board.	7½ gals. alcohol.
1 painter.	1 day's wood, fuel.	1 qt. whiskey.
15 fathoms small line.	1 cooking stove.	1 qt. brandy.
3 lbs. spun yarn.	1 doz. tin pots.	1½ bottles lime juice.
5 oars.	1 doz. tin pans.	7 cans (315 lbs.) pem.
2 balers.	2 brad awls.	17½ lbs. ham.
2 paddles.	2 large files.	8 beef tongues.
1 pike.	3 saw files.	4¾ lbs. pigs' feet.
14 spoons.	2 gimlets.	2½ lbs. coffee.
3 forks.	2 nail sets.	2 pkgs. matches.
1 dipper.	1 punch.	3 candles.
1 tin dish.	1 cold chisel.	1 can-opener.
1 glass bottle.	1 pincers.	2 oz. tacks.
7 sleeping-bags.	1 plane.	1 piece putty.
5 knapsacks.	1 Bowditch.	1 lb. iron nails.
1 bag moccasins.	1 compass, out of ord.	2 oz. copper nails.
3 hanks twine.	2 tents.	½ lb. raw cotton.
1½ bbls. cotton twine.	8 poles.	1 brace and bitts.
1 piece wax.	2 rubber sheets.	1 small hammer.
1 roping needle.	3 Remington rifles.	1 hand hammer.
1 roping palm.	255 cartridges.	1 cutting nippers.
1 pap. harness needles.	Boat box, viz.	1 spoke shave.
1 tind. box, flints, steel.	1 sq. ft. lead.	3 chisels.
2 doz. wind matches.	1 sq. ft. tin.	88 lbs. sugar.
1 boat-hook.	1 snow knife.	15½ tea.
1 boat cover.	1½ lbs. salt.	4½ Liebig ext.
2 saws.	1 lb. tallow.	1 pocket chronometer.
1 broadaxe.	1 doz. fish-hooks.	1 pocket compass.
2 hatchets.	2 fishing lines.	1 binocular.
1 rudder.	2 spools of thread.	1 drawing knife.
1 yoke.	2 screw-drivers.	1 whetstone.
1 tiller.	9 gals. water.	

WHALEBOAT.

4 oars.	3 Remington rifles.	1 pocket chronometer.
1 mast and sail.	1 shot gun.	9 cans (405 lbs.) pem-
1 boat-hook.	245 Remington rifle car-	mican.
2 tents.	tridges.	<i>Boat box, viz.:</i>
8 tent poles.	2 cooking stoves.	2 snow knives.
1 day's fuel, wood.	12 pots.	3 candles.
8 sleeping-bags.	12 pans.	1 paper tacks.
1 boat cover.	12 spoons.	40 cartridges.
1 bag foot gear.	1 axe. 1 saw.	1 flint steel, tinder, and
1 bag clothing.	10 men harness.	matches.
3 knapsacks.	2 rubber bottles lime	2 fish lines.
6 rowlocks.	juice.	4 hanks heavy twine.
1 rudder.	1 rubber bottle for	2 balls cotton twine.
1 tiller.	water.	1 palm.
1 paddle.	8 galls. water in kettles.	2 roping needles.
1 luff tackle.	15 $\frac{1}{6}$ lbs. tea.	1 lb. salt.
1 quart whiskey.	2 $\frac{1}{2}$ lbs. coffee.	10 lbs. sheet lead.
1 quart brandy.	9 lbs. ham.	1 ball marline.
9 gallons alcohol.	8 lbs. tongue.	1 file.
1 boat bucket.	4 $\frac{3}{4}$ pigs' feet.	1 hatchet.
1 pike.	5 Liebig extract.	1 lb. tallow.
3 small cedar boards.	1 compass.	1 lb. nails.

FIRST CUTTER.

7 $\frac{1}{2}$ lbs. ham.	2 rubber bottles lime	2 tins specimens.
9 lbs. tongue.	juice.	9 galls. alcohol.
4 $\frac{3}{4}$ lbs. pigs' feet.	2 quarts brandy.	12 cans (540 lbs.) pem-
7 $\frac{1}{2}$ lbs. Liebig extract.	1 quart whiskey.	mican.
3 $\frac{1}{4}$ lbs. coffee.	4 tin cases books.	1 mast.
10 $\frac{1}{8}$ lbs. sugar	1 tin chart case.	1 yard.
20 $\frac{3}{4}$ lbs. tea.	2 opera glasses.	1 sail.
1 box chronometer	2 cooking stoves.	1 rudder.
(1630).	4 dippers.	1 tiller.
1 pocket chronometer.	1 bucket.	1 yoke.
1 pocket compass.	15 mess pans.	6 oars.
1 sextant.	13 mess cups.	2 boat-hooks.
1 artificial horizon.	13 mess spoons.	1 brad-awl case.
1 box medicines.	8 rubber bottles.	1 boat sled.
1 boat cover.	2 Remington rifles.	1 hammock.
9 single sleeping-bags.	297 cartridges.	3 bags of clothes.
1 single sleeping-coat.	3 Winchester rifles.	11 men harness.
1 treble sleeping-bag.	226 Winchester car-	2 tents.
1 rubber sheet.	tridges.	8 tent poles.
2 sled covers.	1 ensign.	2 demijohns alcohol.

1 pickaxe.	1 hatchet.	1 wrench.
1 shovel.	1 hammer.	3 candles.
1 bundle sled lashings.	1 pot grease.	1 spirit lamp.
15 fathoms small line.	1 bag nails.	1 flint and steel.
1 instrument box.	1 bag tacks.	2 balls cotton twine.
matches.	1 snow knife.	4 hanks hemp twine.
1 dog.	3 fishing lines.	1 palm.
<i>Boat box, viz.:</i>	$\frac{1}{2}$ doz. fish-hooks.	10 fths. 3" hemp.
1 marlin-spike.	4 sail needles.	1 lead line.
1 pricker.	1 piece sheet lead.	3 cedar boards.

The people are distributed as follows : —

FIRST CUTTER.

Lieutenant De Long,	Noros,
Dr. Ambler,	Görtz,
Mr. Collins,	Dressler,
Nindemann,	Iversen,
Lee,	Alexey,
Ericksen,	Boyd.
Kaack,	

SECOND CUTTER.

Lieutenant Chipp,	Sharvell,
Mr. Dunbar,	Starr,
Sweetman,	Manson,
Kuehne,	Ah Sam,
Warren,	Johnson.

WHALEBOAT.

Mr. Melville,	Tong Sing,
Master Danenhower,	Aneguin,
Mr. Newcomb,	Leach,
Cole,	Lauterbach,
Wilson,	Bartlett.

All this work kept us busy. During the forenoon Boyd called my attention to land to the southwest, but after looking carefully with a glass I was not sure about it. At 2 P. M., however, it showed plainly enough, and extending between S. and W. (magnetic).

There was no doubt in my mind that it was the Island of *New Siberia*, but at 4 P. M. I got a time sight, and that settled it. Assuming a latitude of $75^{\circ} 30' N.$, I got $147^{\circ} 50' E.$, and that ran through the western portion of the island. The ice has packed very heavily around us, and we are drifting west very rapidly. Close to the land is a lane of water, which will be all we want if we can reach it.

I called Chipp and Melville into my tent this afternoon, and gave them information in regard to my plans for the future and such general verbal directions as to their boats, food, and other things as were advisable. Ordering them in all cases to keep close to me, I think, covers any other point; for if I am always at hand to refer to, they need no orders in advance, and if unfortunately we get separated things must be left to their judgment. In this latter case they will, without delay, proceed to the *Lena*, and not wait for me or anybody short of a Russian settlement large enough to feed and shelter them.

The wind is moderating, and the barometer rising rapidly at six P. M., and I hope for good weather tomorrow, when, with God's blessing, I expect to start on our journey afloat. *Kasmatka* too clumsy and big,—shot him.

Being so near the end of this book I will keep the remainder of my log in a second one.

Provisions in First Cutter, August 20th.

17½ lbs. ham.	3¼ lbs. coffee.
9 lbs. tongue.	10¼ lbs. sugar.
4¾ lbs. pigs' feet.	20¾ lbs. tea.
7½ lbs. Liebig's extract.	630 lbs. pemmican.

Issue for One Meal for Thirteen Men.

4½ oz. tea.	Pemmican, breakfast,	4¾ lbs.
8¾ oz. sugar.	supper,	4¾ lbs.
8¾ oz. coffee.	dinner,	6½ lbs.
3¼ tablespoonfuls Liebig's extract.		—
		16¼ lbs.
Lime juice 1 oz.		

STARBOARD WATCH.

Nindemann,
Görtz,
Alexey,
Iversen,
Kaack.

PORT WATCH.

Ericksen,
Lee,
Dressler,
Boyd,
Noros.

August 21st, Sunday. — Called all hands at five. Breakfasted at six. Last night Nindemann got soundings in eight fathoms, — sand and mud. Rapid drift W. This morning the soundings are the same, but there is no drift. Fresh E. wind, but still much more moderate than yesterday. Temperature 25°.

So much ice has closed in around us that it looked as if we had never been afloat at all, and though the wind has moderated, we cannot resume our journey. There are no leads for boating, and no floes for sledging, and our surroundings seem as icy as ever. However, I know that a change of wind will scatter everything again, and I most hope to make up for these two lost days, though, in my human judgment, I deplore the loss of those three hours yesterday as a heavy blow.

Read divine service in my tent at ten A. M. At noon got a meridian altitude. Latitude 75° 40', and making yesterday's sight with this latitude, I get 147° 31' 30" for the longitude. This puts us eighteen miles north of

the coast, and about the same distance from the West Cape, — which we would have to round to get into the channel separating New Siberia from Faddejew Island. During the day such little things about the boats as were left undone yesterday were completed, and I think we are as ready to go to sea as we can be. We are now living according to our boat organization, serving out provisions from our boats. Piped down at nine. Wind N. E. Barometer 30.17 at 42°.

August 22d, Monday. — The situation remains unchanged, and though the wind is now N. N. E., and the barometer 30.18 at 32°, seemingly at a stand, the ice as yet shows no sign of slacking. Clear, bright, and beautiful weather. The land shows out plainly between S. 30° E., and N. 85° W. (magnetic) bearings, and I think we have gone something to the southward and something to the eastward. Temperature 25°.

My birthday — thirty-seven years old. My last was remarkable by my narrow escape from a bear, and I trust this will be remarkable as dating an escape from the ice.

Toward noon the wind backed to N. and the barometer fell to 30.10. We have already commenced to drift again, apparently before the wind. But my latitude at noon was 75° 40', only a few seconds south of yesterday, and I think it likely we are moving east. Hoping for the wind to go to N. W. and loosen this pack, we can but wait.

And wait we did, during the long day, without a change in our favor. The wind hung at N., and blew a moderate gale, but we are so closely pressed down on the coast of New Siberia Island that our drift is but slight. Still I think we are moving east, and if the wind will only get some westing in it during the night,

we may find plenty of water in the morning. The barometer has fallen to 30'' at 43° by eight P. M., and the scud seems flying from the northwest.

August 23d, Tuesday. — When I awoke this morning it was to hear the wind howling around us, and the sleet driving against the side of our tent. The wind was N. N. E. The barometer was 20.78 at 35°, and the temperature 29°. We are apparently in for another lost day. No one seems to mind our having no bread. Our rations now are exceedingly simple. The coffee being gone we have tea at all meals.

Breakfast: Beef extract, tea, pemmican.

Dinner: Tea, pemmican.

Supper: Beef extract, tea, pemmican.

Pemmican per day one and a fourth pounds; tea, one half ounce; Liebig's extract, one half ounce.

But we seriously feel the absence of tobacco. Those who have a little piece left use it rarely and sparingly, and the lucky ones are few in number. The rest go without, or smoke coffee-grounds, or coffee-grounds and tea-leaves mixed. The smoking of coffee-grounds gives our tent the odor of a grocery where coffee is being roasted. I expect I shall come to it to-morrow, for my last pipeful of tobacco is to be smoked after supper to-night.

Soundings in forty-four feet, no drift, mud and sand. No change in the weather up to seven P. M., except that the barometer seemed to stand at 29.70 at 40°, and the wind moderate; but the ice remains jammed as hard against us as ever. Wind N. E. Temperature 28° Fahrenheit. Just before piping down Nindemann shot a small seal, which will make a welcome addition to our next breakfast.

August 24th, Wednesday. — Called all hands at five.

Breakfasted at six. Light E. S. E. breeze. Temperature 24° . Soundings eight and three fourths fathoms. Slight drift N. W. To-day, at dinner we in No. 1 tent tried, our pemmican fried in its own grease, and as a change it was excellent. I have been much amused all the morning at hearing men in No. 6 tent talking about good things to eat, and the conclusion reached about the excellence of Boston baked beans and brown bread. The extent of my longings thus far is for fried oysters, and recollections of their delicious taste will come up. The day passed in dreary stupidity. The wind grew light and backed to N., while the barometer fell to 29.53 at 40° . The ice commenced to slack up a bit without opening any way of escape. Mr. Collins shot a seal, which gave us about three fourths pounds each fresh meat for supper. Temperature 22° .

August 25th, Thursday. — Called all hands at five. Breakfasted at six. Barometer 29.36 at 36° . Temperature 24° . Light N. air. Otherwise the situation is the same, discouraging, disheartening, consuming provisions without doing work; owing to our having cut up our sleds, we are not making inroads on our alcohol for fuel, and there is a slight comfort in that, but provisions are diminishing all the same, whether cooked with alcohol or wood. During the afternoon a seal was brought in — twenty-two pounds — which gave us a good supper.

The wind at seven P. M. was very light and westerly, sometimes N., sometimes N. W.; and there was a very little movement in the ice toward the east. Temperature 27° in the sun, fell to 24° in the shade. If the change of the moon has had anything to do with the weather, the new moon at six this morning ought to have made a difference; but except that the ice is slacking off a little from our floe piece, there is no

more chance of resuming our voyage than there was yesterday.

August 26th, Friday. — Called all hands at five. Breakfasted at six. Calm. Ice tightly packed still. Temperature 24° . Used the last of our sugar at breakfast. This may seem like a loss, but the announcement received no attention whatever. During the forenoon Bartlett shot a small seal, which we shall add to our usual pemmican ration. Got a time sight: $147^{\circ} 38' 45''$ E.

Since the evening of the 22d I confess I have been perfectly miserable for want of a smoke. This afternoon, after dinner, Ericksen came to me, saying he had noticed me going around without smoking, and he tendered me a small packet of the precious article, tobacco. I declined more than a pipeful, but he insisted upon my taking more, saying they had enough for some days in No. 6 tent. I sought out the doctor and Nindemann, and made them as happy as myself. And now, "Richard is himself again." Mr. Dunbar shot and secured a seal, so we are in for a good supper.

And so another weary day dragged along. By seven P. M. a light N. W. wind had freshened somewhat, and while the ice seemed slacking, much water sky showed to the southward and eastward, and the temperature, which had got as high as 28° in the sun, now was at 26.5° . Still no chance to move, and so far as human judgment can perceive, seven days have been utterly lost by three hours' delay a week ago.

August 27th, Saturday. — Called all hands at five. Breakfasted at six. A clear, bright morning, but tightly packed ice. Light N. air. Temperature 24° . At noon I got latitude, $75^{\circ} 37' 28''$, showing two and a half miles southing since the 22d, and thus another day passed.

A freshening N. W. breeze. Temperature 26° at six P. M. Land showed between south and west. Evidently we are more to the eastward than before. The bearings of the extreme of land showing are 58° E. and N. 71° W., both magnetic. Toward eight P. M. lanes of water could be seen between us and the land, and running parallel with the coast, but we were separated from them by a mass of confused hummocks and water gaps, over which it is simply impossible for us to drag our boats and provisions.

August 28th, Sunday. — Called all hands at five. Breakfasted at 6.30. Wet fuel caused the delay. Light snow falling. Wind N. W. Temperature 27° . Seemingly more to the eastward in the brief glimpse we get of the land. Divine service at ten. The ice seemed to be loose, and here and there swirling around. Next the land quite a lead showed, and numerous unconnected ponds formed below us and it. Hope for a chance after all. At eleven Mr. Dunbar came to me and said he could see the open water to the eastward. Going to the top of the nearest hummock, I saw what I took to be the open sea; but shortly after, Mr. Dunbar came to my tent and informed me that it was land. Land it was, sure enough, and bearing N. 70° E. (magnetic), while the extreme point of our old land bore south (magnetic). Apparently, then, we are *between* the two islands, — Faddejew and New Siberia, — and our being jammed is accounted for. In one respect we are better off, because nearer the Lena River; but in another, I do not like it, because no one can tell how long we may be caught.

And thus another weary day passed away. No seals to amount to anything, and as shy as if they had been hunted regularly. Our drift along the land, which was

at one time quite rapid, slacked up by seven P. M., and the wind veered to N. Numerous lanes of water showed, but none which we could use. Temperature 25° . The wood being all burned, we to-night had to commence again on alcohol to cook with.

Being miserable all day without something to smoke, I had tea-leaves to-night, and, to my pleasant surprise, got considerable comfort. Soundings in forty-four feet, mud and sand. Drifting south. At eight P. M. the wind had veered to N. N. E.

August 29th, Monday. — I have concluded that there is very little use in calling all hands at five A. M. day after day, when we have no chance to move along — and God knows the hours of waiting pass drearily enough without unnecessarily lengthening the days. Accordingly, all hands this morning slept on until 6.30, and when up we found that the ice seemed more tightly closed than ever. A mist and fog prevented us from seeing the land, or anything more than a mile, but within that radius no water could be seen. Temperature 20.5° , and light N. E. air. Soundings in forty-four feet; slight drift to leeward.

At twelve Mr. Chipp came to my tent and informed me of a lead making south along the west side of our floe. At once finished dinner, broke camp, and carried our provisions across the floe and dragged our boats. At one P. M. got under way, and proceeded south till 1.30, when we were brought up. At three resumed our journey, making between east and southeast until six, when we made south to south southeast until 8.30, then, seeing nothing promising, I hauled alongside a floe, unloaded, and hauled out. At 1.30 we had soundings in six fathoms, at four in four fathoms, and at 8.30 five fathoms. The ice was in one great swirl and flurry,

and we narrowly escaped being crushed. Very rapid drift before the wind. I hope we are through the neck of the strait, and may go on to-morrow.

August 30th, Tuesday. — Called all hands at four A. M. Broke camp and loaded the boats. Land in sight, extreme point bearing S. 46° W. (magnetic). Now what point is this? Nothing can be seen of land more southerly than this, and we can hardly have come so far south during the night as to bring the southern end of Faddejew Island on this bearing. Soundings in five fathoms; rapid drift southward. The ice was swirling around us at a great rate, and we were sweeping by the land (probably five miles distant) at a good speed. To launch and load boats in such a hell-gate was a ticklish thing, but I knew it would look less terrible when we were once among the ice-blocks and went ahead.

At 4.50 we were under way. Got breakfast in the boats at 5.50. Weather bright and pleasant. Light, variable air. Making south course in streams of drift ice. Barometer 30.32 at 26° . Temperature 20° . The bright sun was very warming and comfortable, and, whilst we had it, we forgot the low temperature. Soon, however, a fog spread over us and nearly hid the sun, and at once the weather seemed raw and wretched. At eleven A. M. the land was seen by me bearing west through the streams of ice in which we were steering south, and I at once decided to head for it. Our water spaces were growing larger and larger, and apparently we were at the edge of the ice at last, and at the open sea. I selected the best looking floe piece I could see, and ran alongside of it for five minutes to replenish the snow supply. Sounded in four fathoms, and headed immediately thereafter for the cape or headland seen on a west bearing. Until I can get sights, or have some other

undoubted proof of the correctness of my surmises, I can only think that the cape was Cape Peszowij. At two P. M. passed the last line of ice between us and the land, and sounded in fourteen feet water one and a half miles from the land. At 3.10 made the cape, but, to my surprise, upon getting to within fifty yards of the beach, my boat struck in the mud. Compelled to seek another place, I headed across the bay for the spot marked as Faddejew Hut; but seeing a nice looking place for a landing, at six P. M. I stood in towards it. To my pleased eye there was presented a grassy or mossy slope for a camp, whole trees of drift-wood, and small snow piles which I felt confident did not contain salt; but alas! we struck the mud a hundred yards from the beach, and could do nothing. I lightened the whaleboat of all but two men and Melville, and sent her in to try and make a landing, then act as a ferry, but she struck fifty yards from the beach. We pulled away again, and, anticipating a night in the boats, we commenced to cook supper.

But I then perceived further south a piece of beach which showed gravel and not mud, and I ordered Melville in to try it, relieving him of his men as before. To my great satisfaction he succeeded, and then, acting as a ferry back, he assisted us, and by 6.45 P. M. all of us were on good firm ground for the first time in two years. My relief was great after the strain of the past ten days, and the mental tension caused by the last two days' work. To get moss and grass under my feet again warmed me, and my freezing feet got back their usual temperature. We moved up on the mossy level back from the beach and camped, and our remaining dog, Snoozer, tore around in glee, chasing lemmings, whose holes were abundant, while we human beings

more seriously sought for eatable game. Deer droppings were found quite fresh, pieces of deer horn, tracks of a hare, flocks of black geese, etc., and whole trees of Norway pine. Ponds of water were found on the level plain where we camped, and we promptly got rid of the salt snow water and laid in a fresh supply.

Our last ration of lime juice was issued this morning.

After supper hunters went out. Light S. E. breeze. At eight P. M., barometer 30.30 at 30°; temperature 24°. Increased the ration of pemmican to one and a half pounds per diem, — three quarters at dinner, three eighths at breakfast, three eighths at supper.

CHAPTER XVI.

THE NEW SIBERIAN ISLANDS.

31 August — 11 September, 1881.

Deer Tracks. — A Deserted Hut. — Coasting along the Island. — Rough Water. — Across the Strait. — Separation of the Boats. — Terrible Anxiety. — Reappearance of the Second Cutter. — Letter to Mr. Chipp. — The Hardest Morning's Work. — The Sand Bank. — Landing on Kotelnoi. — A Retrospect. — Signs of Life on the Island. — Hut. — Explorations. — Candle-Snuffer Hills. — Under Way again. — Semenovski Island. — Deer and Ptarmigan. — Elephant's Tusk. — Record for Deposit.

AUGUST 31st, *Wednesday*. — Called all hands at five. Light E. air. Temperature 22°, but the air seemed as mild and pleasant as it did when the temperature was above 30°. The hunters brought in but three ducks, and a small number of sanderlings. Deer tracks were found to be plentiful and fresh, and numerous pieces of horn — one piece with the velvet still on it.

Mr. Sweetman and the steward found, about one and a half miles below to the southward, a hut tumbling to decay on the right bank of a small river. This is doubtless the "Faddejew Hut," marked on the chart, and establishes well our position.

The doctor this morning saw a ptarmigan. Breakfasted at six. Turned to at 6.30, and carried everything down to the beach. Launched and loaded boats in the inverse order of last evening. Under way at 7.20. At eight passed Faddejew Hut, and continued to south-

ward. At 11.20 attempted to land for dinner, but took the ground three hundred yards from beach. Proceeded under sail, while dinner was on hand. At three rounded South Cape. Saw several piles of timber, or old huts. At 5.30 attempted to land for supper and camp, but took ground five hundred yards from beach. Whaleboat lightened could not get nearer than three hundred yards. Concluded to go on under sail all night. Barometer 30.42 at 29°. Temperature of air at three P. M. 28°, of water 33°. Tidal action two feet five inches. Ducks, owls, snipe, seals.

Accordingly we proceeded, and believing myself to be clear of the sand bank, I shaped a course west south-west, which giving us the wind nearly aft, was an easy one to make. The breeze freshened, and we went along at a fair rate until ten P. M., when, to my surprise, we saw ice ahead and on both bows, and all at once we stuck fast in the mud. We had encountered an arm of this sand bank, and the ice was small pieces grounded at its edge. From this time until midnight we were fully occupied in tacking and pulling to keep in water deep enough to float us. The night was very dark, and altogether our surroundings were wretched; two feet of water seemed to be all we could find, and then eight feet, suddenly changing to two feet again. We had no anchors, and nothing except pemmican heavy enough to use instead. As our pemmican tins are all "holey," the use would involve wet and condemned food. I tried to make an anchor out of a pickaxe and tent-pole, but it would not bite. I next tried to hold my boat by driving tent-poles in the mud, but she broke away. Sleep was impossible for anybody, and we waited in wretched discomfort for the morning's light.

September 1st, Thursday. — At two A. M. sufficient

light for going ahead and seeing our way. Managed to get the first cutter and whaleboat around the edge of the bank by pulling and tacking, but we got so far ahead of the second cutter that she was lost to view. At six A. M. I ran alongside a grounded floeberg (in six feet of water), and while we were waiting for the second cutter got breakfast.

At 7.10 Chipp hove in sight, and I got under way again. Before this, however, we had pitched tents for eating, and were nearly drowned out by the sea breaking over as the tide rose. Stood along good full with an E. S. E. wind. Barometer 30.42 at 41°. Temperature I do not know. On the port tack, and kept a man in the bows sounding with a tent-pole. Suddenly shoaled to three feet, and before I could get around, stuck fast. Whaleboat tried to drag me off, but got me on a reef, and we nearly filled the boat with water. Got off and proceeded with freshening wind and deepening water, on south southwest course until noon, southwest after eight, and at three, west southwest. Increased water to forty-four feet, at twelve; five fathoms, at two; five and a half, at three; eight and a half, at four; nine and a half, at five; when having lost sight of second cutter, ran alongside floe to wait for her. We were making excellent time. The first cutter and whaleboat going at times five to six knots an hour. The sea was increasing somewhat, and unless we kept our boats going ahead full speed, the water would have come over our rails in too large quantities for our control; as it was, a sea would come in occasionally, wetting us to the skin and forcing us to bail, as well as pump constantly. I almost welcomed some little streams of drift ice, for they gave smoother water under their lee, though presenting nothing large enough to hang on to

while waiting. At four P. M. I saw a good-sized piece, and ran both boats up to it. I could see nothing of the second cutter, but I did see enough to make me anxious. The ice was coming in on us in all directions, much as it did on August 20th, and I feared we might again be caught. There was no ice around us large enough or safe enough to camp on, and nothing remained but to go on. I had full confidence in Mr. Chipp's ability to take care of the second cutter, and I had no doubt he would soon overtake and rejoin us. At five, seeing a good large floe piece, I ran up to it, as before stated, got supper, and then camped and turned in.

Being successful in keeping clear of the sand bank during the day, we did not see the island marked in the middle of the southern edge; in fact, I had given up all idea of making for it, and was now heading so as to keep clear of the sand bank, and make the south end of Kotelnoi Island. The distance was about seventy miles from the south cape of Faddejew Island, and though I could not tell how far we had run last night before bringing up against the reef, I estimated roughly that by five P. M. we had run fifty miles of that seventy. The land was not yet in sight, though low-lying clouds from west southwest along to the right indicated its presence. Everybody was wet and cold, and we crawled into our bags with great content. Temperature 26°. Wind increasing and promising a gale.

September 2d, Friday.—The wind remained at E. S. E., and was blowing a gale with snow, at five A. M., when all hands were called. Temperature 29°, at seven. Nothing has been seen of the second cutter during the night. Soundings ten and a half fathoms. Rapid drift W. N. W. But very little sleep was ob-

tained by anybody during the night, and we devoted the day to making up our deficiencies of two nights. The gale tore around us unheeded, and were it not for the second cutter's separation from us, it would have been comfort to me. But anxiety and care seem to be my steady companions now, and they are doubled in intensity.

During the afternoon Nindemann saw the land bearing from west to northwest, and he thinks seven miles distant. The snow let up for a time, and occasional lulls were noticeable in the wind. At six P. M. the temperature was 29°. Thick snow again falling. Soundings four and a half fathoms water. Drift not so rapid. Lest Mr. Chipp and his party should be within a short distance unseen and unseeing, I had a black flag prepared and hoisted at our mast-head as a signal.

Piped down at nine P. M. So much ice has closed around us that it is hard to believe we came here through open water. No longer is the ice navigable for our boats, and a shift of wind alone can send it streaming away. To the westward it is held by Kotelnoi Island, and to the northward by the sand bank, and all the movement that is now taking place is simply the massing together.

September 3d, Saturday. — Called all hands at six. Strong breeze S. E., though not a gale by any means. Nothing seen of the second cutter or her people. Temperature 29°. Soundings twenty-two feet water. Water in sight to north and northwest (probably the water to edge of sand bank), and strong appearance of land west to west northwest.

Up to noon the wind moderated considerably, and the sun made several efforts to struggle through the clouds. I was in strong hopes that the gale was over,

and that a favorable change of wind would occur. But after dinner the barometer commenced to fall again, and the wind increased. By four P. M. a gale was again blowing. The barometer had fallen to 29.90 at 32°, and the sky was one dull, leaden gray. The land showed quite plainly. Seemingly mountains back of a coast line of the same height as that of Faddejew Island, viz. : fifty to ninety feet. How far it is off I can only guess, — it may be ten miles. What with my anxiety about the second cutter, and the uncertainty of our own future, I am nearly worn out, and the resumption or continuance of this southeast gale, which more closely packs the ice around us than ever, adds hour by hour to my care.

But thank God relief came sooner than I expected. At 4.45 P. M., Aneguin, who was on the lookout, saw a sail and called us out. There the second cutter was, sure enough, about half a mile off, skirting the edge of the ice to northward, where it had apparently grounded against the sand bank. When she arrived abreast of us, she came to alongside the ice and hoisted a black flag at her mast-head.

At 5.50 Mr. Chipp and Kuehne came over the ice to us, and we had them to supper. They lost sight of us at three P. M. on Thursday, and soon after nearly filled with water. Hauled out, etc. For further details, Chipp will give me a written memorandum when we get ashore.

I gave him the following letter : —

SATURDAY, *September 3, 1881.*

MY DEAR SIR, — I am very glad to see you close to us again, for I have been very anxious for forty-eight hours. When we commenced dropping you astern on Thursday, the sea was running so high that I had to carry on sail to keep

the water out of my boat until I could find a floe piece large enough to hold on by until you came up.

While waiting, we were beset as you see. If your boat and people are in a position of security, wait where you are until the end of this gale or a shift of wind enables us to join. My intention is to make at the first opportunity for the south cape of Kotelnoi, or a convenient landing-place near it on the southeast coast, and as soon as water is laid in and weather favors to go as far as Barkin (Lena Delta) via Stolbovoi Island. The distance from south cape of Kotelnoi Island to Stolbovoi is sixty-five miles southwest by west, and from Stolbovoi to Barkin one hundred and twelve miles west southwest (see your chart). You will be prepared, after falling in with me, to send one man to the first cutter and one man to the whaleboat, for your load must be reduced so that you can keep up.

Make every effort to keep within sight, *and, if possible, within hail* at all times hereafter; but if by any mischance we should become separated again, make the best of your way to the Lena River, and try to reach some settlement large enough to feed and shelter your men before thinking about waiting for me. I do not think the land is more than ten miles off. We came alongside of this floe in ten and a half fathoms water and have drifted into three and a half fathoms.

I intend hereafter to keep a small black flag at the mast-head of the first cutter whenever the sail is not set.

Very respectfully,

GEO. W. DE LONG,

Lieut. U. S. Navy, Commanding Arctic Expedition.

Lieut. C. W. Chipp, Executive Officer, Commanding Second Cutter.

To-day, at dinner, the whaleboat and first cutter fairly divided twelve ducks (seven to me, five to Melville) which had been shot, — two at Faddejew Island, and ten which were shot on the 1st inst. I knew the second cutter had one duck and three sanderlings, and I wished to keep our stock until we came together and

could make a fair division; but the birds had been washing around in the bottom of the boat, and I feared they would spoil. Hence a good dinner was made of them, and half a pound of pemmican per man.

Chipp seemingly has run about thirty miles since ten this morning along the edge of the sand bank, and where he now is (about one mile north of us) he is in four feet of water, and can see the edge of the sand bank as far as eye can reach. From our camp we can see the land from west to northwest, and I am strongly in hopes that the water extends inside of the grounded ice even to the land. We are in twenty feet of water and not drifting, and I have arranged with Chipp a signal for to-morrow morning in case I decide to cross the ice and float again in the shoal water, in which case I shall use his men to help. Fresh southeast gale still blowing.

September 4th, Sunday. — Called all hands at five. Breakfasted at six. Strong S. E. wind. Temperature 27°. At 6.30 started ahead Nindemann, Bartlett, Iversen, Lauterbach, and Kaack to cut a road good for boats, and then sent after them everybody with a bundle of some kind (sleeping-bag, box, or package) to cross to Chipp's camp. Lee and I remained alone behind. At 8.30 started with the boats over the ice, but, owing to very rough road and hard dragging did not reach Chipp's tent until one P. M. This has been, without exception, the hardest morning's work we have yet had, for as our boat sleds are no longer in commission, all dragging has to be done on the keel runners, and there is no protection for the bilges of the boats. The ice is massed in a very rough and confused pack, and sharp edges are innumerable. Long strips are peeled off the keel runners as we drag along, and the boats themselves

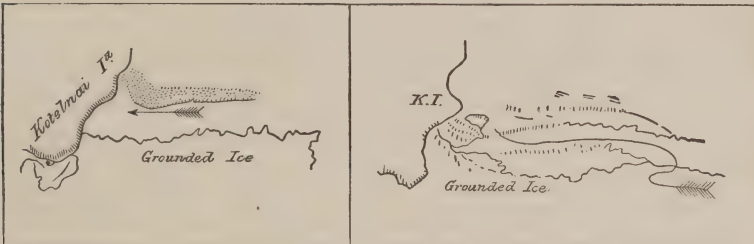
get many a scratch. By placing the mast athwart-ship the rail, and lashing down to a thwart, sufficient leverage is obtained to keep the boat upright without much difficulty; but it is the sudden drop from a lump into a hollow, or the slide and sudden bring-up, that starts the seams and does the damage. Holes between grounded floes are common, and occasionally a man breaks through and falls in, and has to be run along to get dry clothes. So little food remains that I did not dare take it out of the boats and carry it by hand, lest a man falling in should lose a can of pemmican, which means a day's food for all hands, and consequently the usual heavy weights of the boats were increased. However, at one P. M. the water was reached, and we got dinner ready with all dispatch, sitting down at two.

The water is here six feet deep, and the shoal or sand bank lies north of us, and stretching along from east to west about two hundred yards distant. About one hundred and fifty yards from the grounded heavy (*i. e.* six feet thick) ice, there is a long string of smaller grounded pieces, and fifty yards beyond the hard sand bank. This makes two bars, as it were, and offers two channels which seem to run to the west for a couple of miles, and then sweep around somewhere to the right.

In order to avoid the grounding of the first cutter (now carrying fourteen men, Ah Sam being our addition from the second cutter, — Manson went to the whaleboat, now carrying eleven), I ordered Chipp to go ahead, Melville to follow, and I brought up the rear. At three P. M. we started (the ice having considerably broken under me, and sent me overboard up to my shoulders a minute before), and flew down the deep channel W. before a strong S. E. wind, with snow

squalls. After running two or three miles Chipp suddenly took in sail, and coming near me reported no passage ahead. Turned about and made the two other boats tow me in line ahead for about three hundred yards to windward, and then went through an opening into the shallow channel, and ran along to the westward, as before, in about four feet of water. To my surprise, the ice seemed packed in close to the land in all directions, and I began to think we were in for another night in the boats, or a hazardous camp on small grounded ice lumps. Water enough was on our N. E. hand, but that led towards the reef or sand bank, and was, therefore, not desirable. By hugging the grounded lumps close on our port hand, we worked ahead rapidly, so much sea having got up that I ran away ahead of the other boats, and kept the lead thus obtained, though the risk of grounding was thereby increased. At one time we were actually running N. E., at another N. (being forced to bring nearer the wind on the starboard tack by the long streams of grounded ice making out from the land), but finally, at five P. M. I thought I had got clear of the last piece and could run N. W. To my surprise I had then on the port hand, or S. to S. W., a stream of grounded ice, and right ahead, or N. W., a low sand bank with one end seemingly raised six or eight feet above the sea. Naturally avoiding the sand bank, I attempted to hug the grounded ice, and suddenly shoaled my water too rapidly for any doubt as to our soon sticking fast. Rounded to at once, and made fast to a grounded floe piece. When the whaleboat came up I unloaded her people (except four) on an ice lump, and sent her in towards the raised sand bank to sound, and the second cutter was ordered to follow her slowly and carefully.

Watching them closely, I saw they had no lack of water, and I took in my boat the seven belonging to the whaleboat, and drifted down toward them. I say drifted, for we were so deep we dared not pole, and still less did I dare to sail. Soon I met the whaleboat coming back, and Melville reported plenty of water right up to the point. Gave him his people, and went on. The second cutter had rounded the point and came to against the beach and I ran in alongside her, and at 6.30 we all landed on the beach or sand bank, whatever it is, pitched camp, unloaded, and hauled up our boats.



What I thought I was doing.

What I was doing.

Now where are we? Snow squalls, fog, and thick weather generally prevented my seeing anything except that we had landed on a sandy spot, with lots of drift-wood, but whether an island, or a low beach extending from Kotelnoi Island, I knew not. Dimly through the snow the loom of mountains could be seen to the westward, but whether distant five miles or fifty I could not say. Everybody was wet and cold, — running before the sea, with loaded boats, being no dry operation, — and I was only too thankful to get a place for my people where we were at least secure, to care much for its geographical peculiarities.

I had been in my wet clothes since falling overboard, and they clung unpleasantly to me, chilling me to the

bone in spite of the ration of brandy which the doctor had given me when I was hauled out, and I was as anxious as anybody to get a fire made to stand in front of to dry by. Chipp said he saw thousands of ducks fly around a point as he came in, but though I at once sent Mr. Newcomb away with his shot-gun, he, at the end of an hour, brought back only one gull, and six miserable little sandpipers, about the size of a fly. While under way, he shot and secured two ducks, and I was anxious for more. The announcement was made that deer droppings were here, and in anticipation of what the barren spot might give us to-morrow, we sat down to a pint of beef-tea, six ounces of pemmican, and one pint of tea without sugar. By this time, we had a roaring fire going, however, and though choked by smoke and scorched by sparks, we stood around it and steamed ourselves into partial dryness. Some of the wood was marked with axe cuts and one piece was cut for a log-house.

The S. E. gale blew harder than ever, and dark night shut in at nine o'clock. Standing by the fire, with my congregation holding wet stockings and other gear to dry meanwhile, I read divine service at 8.30. Though it was the first Sunday in the month and the Articles of War were in order, I postponed them to a more favorable occasion. When anybody felt like it, he crawled into bed.

September 5th, Monday. — Called all hands at six A. M. Breakfasted at seven. More of a gale than ever, with blinding snow-storm. Wind E. S. E. Barometer 29.76 at 32°. Temperature 28.5°. No chance to send out anybody in quest of game, so we must eat our pemmican and wait for something else. I am more and more thankful that I have even a sand spit to live

on, though I do not know where I am. Nothing can be seen through the thick snow but a dim outline of land to northwest and west, — but near or far is a doubtful point yet.

Mr. Collins evidently had a bedfellow last night, a lemming, for when he went out of the tent this morning, one of these little creatures jumped out of the hood of his fur coat and burrowed his way into the sand like a flash. Johnson says he saw a moccasin track in the sand, which was made where none of us had yet been, and it was quite fresh; and some wood around us bears fresh marks of axes. Can this place have been visited lately?

A fossil bone was picked up by the doctor last night. Finding numerous ponds along this sand spit, we, for a moment, supposed that we might find good water, but investigation proved that it was all very salt. The snow-fall this morning gives us a fresher supply, though in drifting over the sand before massing in banks, it collects an appreciable amount of salt.

Mr. Dunbar looks quite ill, and I am afraid has suffered more in the second cutter than he will admit. When we parted company with them, they had their hands full in bailing their boat, and when they ran alongside an ice floe and prepared to haul out, Chipp had to be passed out by hand, he was so cramped from sitting in the cold water. Chipp at once served out two ounces of brandy to each one, and Dunbar immediately threw his up and fainted. I have noticed that all the second cutter's people looked tired and strained, and several of them had swollen faces. When I get Chipp's account in detail, I can set all these things down.

Anniversaries come around with queer comparisons.

Two years ago we were beset in the ship, near Herald Island, and to-day finds us on a sand bank, — which of the two situations is the preferable? To go back with the two years' experience to come, which we know we have had, or to go on with everything unknown before us? I think I will pronounce in favor of the unknown as less gloomy than the known. Toward noon the snow ceased, the wind moderated, and the sun made one or two efforts to shine through the clouds. Mr. Newcomb went out with his gun, but got only two ducks. He brought back, however, the antlers and skull of a deer, pronounced by Alexey to belong to a young deer. Perhaps wolves ate him.

After dinner I sent all the guns out but one. A seal came close in shore, but before our gun had been got he was too far off. Ducks made their appearance, but out of range, had our shot-gun been in camp. Little sand-pipers waded around the shore, and large purple jelly-fish were seen. At two P. M. barometer at a stand, almost calm. Temperature 29°. During the afternoon, as our stragglers came in, various accounts were received of what had been seen. Hundreds of cords of drift-wood to the southeast of us, and curiously enough, lying in lines northwest and southeast. Deer antlers shed naturally. Places under six inches of water, etc. Curious stones were picked up on the beach, among them ammonites. Lee saw the ruin of a hut about one mile southeast of us.

It may seem curious to some people why I do not go around more myself when ashore, instead of taking accounts of others; but the fact is, my feet are swollen with cold, and my toes are broken out with chilblains, and I am unable to get around very much. In the boat I am obliged, like everybody else, to sit or

stand quietly all the time, and my hands and feet are in bad condition from the cold in consequence.

At 4.30 P. M. Chipp and the doctor returned. They had walked about five miles out and back, and though seeing deer droppings and antlers, found no game whatever. They found this sand spit to be the low beach extending out from the main land, and we are, beyond doubt, on Kotelnoi Island. This projecting piece of land has a creek or river on its northwest face which could be traced in toward the high hills (sixty feet high), and we are seemingly at its broad mouth. From this fact, and the immense amount of drift-wood seen by Lee, I am inclined to think we are at the mouth of the Zareva River, though I hope we may prove to be more to the southward, and nearer the southern rivers about Bar-encap.

Chipp and the doctor saw several ruined huts and



Hut on Kotelnoi Island.

much drift-wood. In one place the soil was composed of rotting wood, being quite black. By five P. M. everybody had come in, but no game was brought. The sky had cleared somewhat before a light N. W. air, and we could see something of our surroundings. Kuehne, who had gone around our sand bank to the southward, reported that he had found the ruins of half a dozen huts together, and around them piles of deer horns; and this showed conclusively that some people had been here who could hunt and eat. Besides, Ninde-

mann brought in some fashioned pieces of wood, and a hoop from a fish keg. I am inclined to think we are at the Walakatina River. Leach came in at six, and reported that he had crossed the neck which we are on, and gone along its south side a couple of miles, where he had found a hut built of logs, with rags stuck in the chinks, and an elephant tusk; we saw, also, some smaller pieces of ivory. As the ice was closely pressed in shore, no passage offered for a boat, but as he was leaving, the wind shifted to northwest, and the ice commenced to slack off again. Alexey then came in. He brought in from this hut a wooden drinking-cup, a wooden spoon, a wooden fork, an elephant tusk, and a small Russian coin, a copeck of the date 1840. So somebody has been here since Sannikov. Mr. Collins made a sketch of the hut, and of its surroundings. By eight P. M. a nice breeze from N. W. had sprung up. The barometer was at 29.85 at 41°, and the temperature 28°.

September 6th, Tuesday. — Called all hands at five. Breakfasted at six. Light W. breeze. Temperature 25°. Under way at 7.10, and proceeded very well until 10.30 (say six miles after rounding the point of the sand spit and keeping away to the southward), when we were brought up by the ice reaching in to the shore, and leaving no lane for us to advance in. We turned back to look for a chance off-shore lead, but none offered, and there seemed but one of two things left to do: either to drag our boats over the land, or wait for the ice to slack off. Unwilling further to strain the boats or tire the men, I concluded to wait for the effect of a freshening wind. Meanwhile I sent away the men with guns, and took advantage of the delay to visit the hut seen by Mr. Collins yesterday. It was quite an

elaborate building with a porch; and being plastered with mud on the roof and sides, was no doubt sufficiently wind-proof. No lack of fire-wood. Pine and spruce lay in logs all around, but we had already spoiled it of all relics. Lemmings without number ran around; owls, white and brown, are as common on this island as ducks, almost, and of a great size.

At twelve we dined. The regulation fog had come up and hidden everything, and the wind had all died away. Off shore the ice seems somewhat slack, and I made an effort to get the boats through to a lead, without success. We were obliged to unload, make a portage, and embark again five hundred yards below. At 1.45 P. M. resumed our journey and tracked and pulled along to the southward, following the coast line. In vain did we hope that each piece of land showing through the fog was Barenkap, but at 6.30 Barenkap seemed as far as ever, and I ordered the boats in to the beach for supper. From time to time I sent everybody out of the boats, except the pullers, making them walk along the beach. Occasionally we came to a steep cliff without ice-foot or beach, and then I took them in. On one of these walks the doctor found a slate cliff and fossil ivory.

At 6.30 supper and camp. I climbed the hills and looked for the land's end and the sea, but could see little on account of the fog. The water spaces seemed large, however, and that was one comfort. During the drag overland, I noticed Mr. Dunbar fall out and stagger to one side, when he sat down. I found upon inquiry that he had had another of his fainting spells, and the doctor tells me it is some heart trouble. This is indeed serious, for in the hourly excitements no one can tell what may occur to affect him. He has been di-

rected to do nothing beyond steering the second cutter.

We had, I think, by supper time entirely got clear of the sand bank, for the water was bolder, and we stood along in shore without difficulty. The cliffs made the dividing line, and now, instead of the low, sandy beaches with distant background of hills, we came to stretches of candle-snuffer hills like our land at Faddejew Island. These curious looking dirt-hills are in places seen back from the coast line. In no place yet had I seen land one hundred feet in height at or near the sea-shore. Mr. Collins saw seeming excavations.

At eight got under way again, and proceeded until 9.45 P. M., when, having made three miles, ran in and camped. I consider thirteen miles to represent to-day's work.

September 7th, Wednesday. — Called all hands at five. Breakfasted at six. Wind E. N. E. Temperature 24°. Under way 7.12. About Barenkap 9.12, took departure at 10.30 and met big floe. Went to southeast to clear it, but failed; went to north northwest and succeeded. Filled away again on course S. W. by W. (true). Wind freshening. Ice streaming off before the wind. At 11.05 Melville called out he was leaking more than the pumps could keep free. Ran alongside a floating ice-cake all boats, and hauled out whaleboat. No leak, plug was knocked out in coming through the ice channel six and three fourths fathoms (Barenkap distant about five miles). At 12.10 slipped from ice-cake and proceeded, having cooked dinner in the mean time. At 1.45 double-reefed my sail, as I was leaving second cutter out of sight. At 2.30 turned out one reef. Strong E. N. E. wind. Boats going five to six knots Heavy sea. Boats very wet. Pump and bail all the

time. Cook seasick, then Mr. Collins at supper time. At six wind and sea moderating. Water ration, one pint each meal.

September 8th, Thursday. — At 1.30 ran into loose, streaming ice. Bothered and delayed until 4.30, when wind was found to be S. E. Ran alongside floe, and held on until daylight. Then slipped and ran southwest. Soundings in ten and a half fathoms. Strong wind, rough sea. Everybody cold, wet, and miserable. No sleep. At six weather changed. Bright sky, light S. E. wind. Warm sun. Barometer 29.85 at 40°. Got latitude at noon $74^{\circ} 41'$, north of Barenkap. Evidently running before southeast gale some time before I discovered the fact of the wind having changed. During afternoon steered a course S. S. W. until four P. M., when, meeting a solitary floe drifting around, I had pity on the wet and exhausted creatures around me, and hauled out and camped. Sights place us in $136^{\circ} 42'$.

September 9th, Friday. — Called all hands at four A. M. Somewhat better after our rest, but still wet and cold. Light S. wind. An island in sight, bearing S. 57° E., distant fifteen to twenty miles. Is this Stolbovoi? Temperature 33° . Under way 6.20. Oars and sometimes sail. Ran alongside floe at eleven for dinner. Soundings seventeen feet. Stolbovoi Island bears S. 89° E. (magnetic).

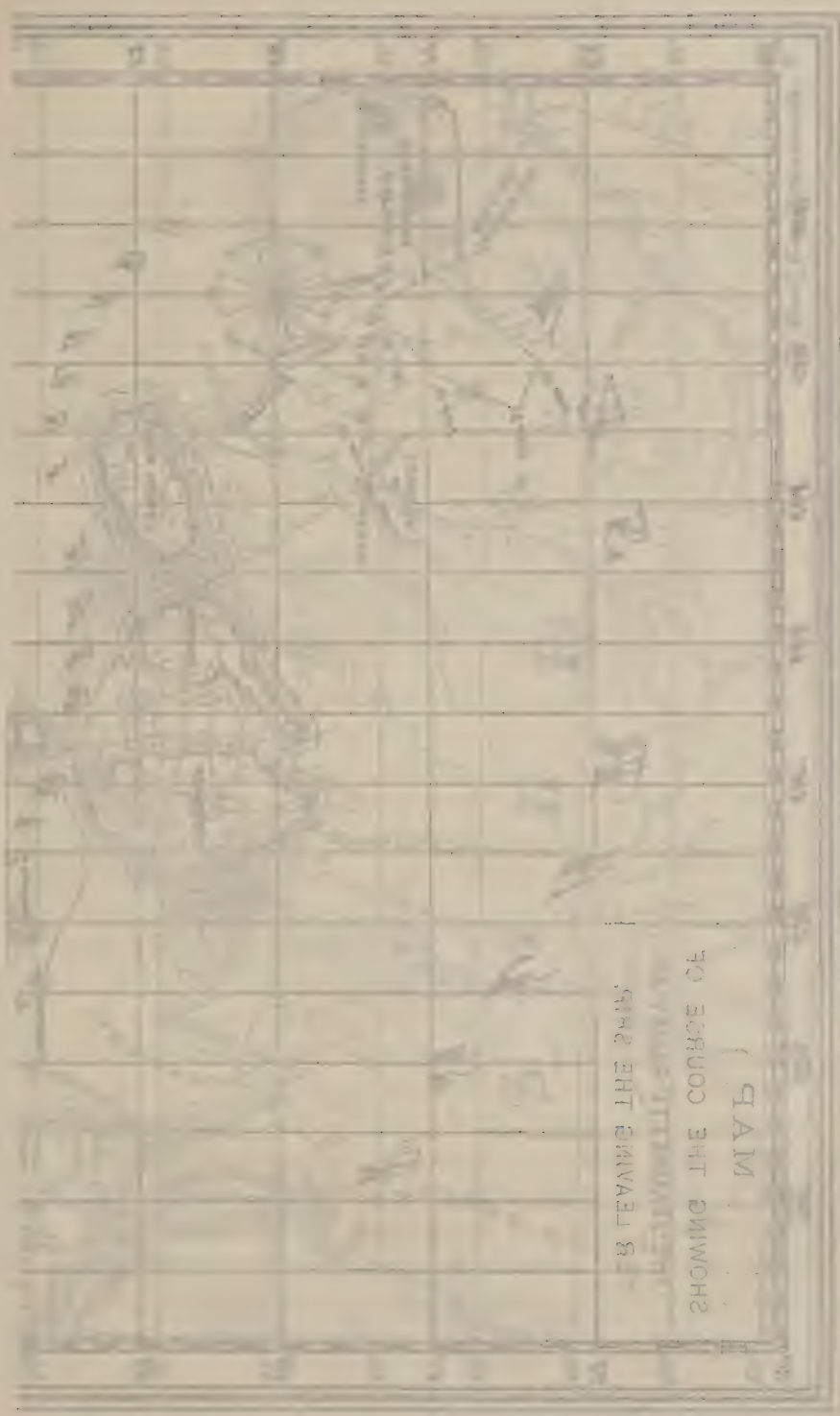
A very suspicious looking mass of hummocks resembling land bore S. 19° E. (magnetic). Got latitude at noon $74^{\circ} 19'$. Light S. by W. breeze, with occasional rain or snow. Under way 12.15. At 2.30 encountered immense area of loose floe pieces, extending to the horizon east and west. Pierced it southwest in a neck about half a mile in width. At 3.30 sighted a low block island to westward. Ran towards it. Calm. At

5.45 laid on oars for supper, twenty feet water. At 6.05 went ahead again. Evidence of tide setting to southwest. At eight P. M. an impenetrable fog settled down over everything, and so completely shut out the land that after pulling until 9.40, three boats in a tow, I concluded to give up for the night. Ran alongside a rough floe piece, hauled out, and camped. Served out tea and four oz. pemmican to each person, and lighted a candle to see to eat it by. Dead calm. Seven feet water. Floe aground.

September 10th, Saturday. — Called all hands at seven. Breakfasted at eight. Light N. E. breeze. Temperature 31°. Our Liebig all gone. Last used for supper yesterday. Other boats out several days ago.

Land in sight about one mile distant the northern end of the island; no doubt Semenovski Island, bearing about west. Yesterday afternoon I saw a second island (Wassilewski Island) to the southward. Under way 8.30. Thick fog. Reached north end of island at 9.10. Stood along its western edge until 11.30, when ran in for dinner. Island seems eighth of a mile in width. Fresh deer-track and bear-track seen. Mr. Dunbar quite feeble. Island seems washing away. Mud. Deer antler found on top of hill. Teeth of mastodon found by doctor. Fresh pond of water found on hill-top. Island from thirty to one hundred feet high. Islands not the result of river deposits, and consequently fossil remains not brought here. That these islands had once tropical climates is proven by the coal found on Bennett Island.

Upon turning to at 12.45 P. M., I ordered five of my party to walk along to the south end of the island in quest of game, and I directed Chipp and Melville to send people from their boats for a like purpose. In



REVEALING THE SHIP'S
 COURSE
 SHOWING THE COURSE OF
 THE SHIP

MAP

SHOWING THE COURSE OF
THE JEANNETTE PARTY AF-
TER LEAVING THE SHIP.



Box's separation by the storm about here.



consequence, I had nine or ten people on the war-path across this narrow strip of land. Proceeded slowly along shore with the boats, and was soon agreeably surprised at hearing several shots, followed by the cry, "He is down!" Being near the south end of the island, I proceeded to round it to pick up the people, but, finding the shore too steep, I returned, and was proceeding along the west side of the island when I met the second cutter with a fine deer in the bow. I at once ran in to a small bay, ordered the boats unloaded, the deer dressed, and a meal prepared immediately. I was much pleased with the information that drift-wood was lying on the east beach of the island; that the hunters had fired at two deer, though one escaped; and that a flock of grouse (ptarmigan) had been seen.

As I had made up my mind to remain Sunday, either on this island or on Wassilewski, I concluded to be satisfied with what I found here, and remain. Food, fuel, and water secured, dry clothing, and a rest in prospect, certainly I was justified in thinking a bird in the hand worth two in the bush. Reindeer moss and scurvy grass are abundant. As soon as we get something to eat I shall send out the guns to secure that other deer, and the bear, if such an animal is on the island. The wind had veered to E., the thermometer at 32.5°.

Wassilewski Island in sight to the southward. The southern end of this (Semenovski) Island is worn away almost to a knife-edge. Standing around it in a boat, one would suppose he was passing under the bows of some very sharp ship. So intense has been the action of the cold that large masses have fallen off the sides of the island and lie prostrate on the beach; and huge cracks indicate where other land slides will occur before many seasons. There is, unpleasantly enough, ice

to be seen in large quantities, but I hope it is a loose, navigable pack, and one we can work if necessary at night. Uncomfortable enough as life in the boat normally is, it becomes absolutely horrible when, at night, in a strong wind we suddenly encounter streams of drifting ice. Unable to see, wet, cold, and wretched from want of sleep, we grapple aimlessly with our foe and try to overcome him.

I ordered one pound of meat to be served out per man, and at 4.45 P. M. we all sat down to a delicious meal of fried deer meat and tea. At eight I intend to repeat the operation, and meanwhile I shall send our hunters out for more game. An elephant's tusk was found by Alexey, and a small number of shells by Mr. Collins, about three or four feet above the sea-level, in the face of the bluff. Bartlett saw a flock of ptarmigan and killed three with one bullet. Two went into a cleft in the cliff, and were inaccessible. Mr. Newcomb shot another.

At eight P. M. we sat down to our supper proper, and a second portion of deer meat was served out to all hands — a little more than one pound each. This gave us a royal meal and finished the deer, except his bones, which we make soup of for dinner to-morrow. We have thus consumed since dinner-time eighty pounds meat alone — no bones — a little more than two and one fourth pounds each, and are feeling comfortable and warm. Wet bags and wet clothing are forgotten in face of hot meat and hot tea. After three attempts we got a dry place for our tents, and at 9.30 P. M. when we went to bed for a long night's sleep, our lesser discomforts seemed to fade away before the warmth and security which Semenovski Island afforded. The wind had freshened considerably, and was blowing half a

gale; snow fell thickly. No more ice seemed to be approaching, and I have strong hopes of being able to go on to the Lena without difficulty. All the hunters returned without seeing any more game, except ptarmigan. But as they only had a couple of hours before dark they could not go very far.

September 11th, Sunday. — The ninety-first day since the ship was crushed and ourselves thrown out on the ice. Called all hands at eight A. M., a long and seemingly refreshing sleep for all hands. Wind E. Barometer 29.90 at 32°. Temperature 32°. At 10.45 called all hands to muster. Read the Articles of War, and then I read divine service in No. 1 tent. Wind freshening again, and snow, hail, and sleet falling plentifully.

The fawn came near the camp twice this forenoon, and once she got, unseen by him, within thirty yards of Alexey, who took up the chase, and had not come in up to noon. I think it is very likely that the deer on this island consist of the one we shot and this fawn, for the coming back to the place of separation would hardly occur were there any others in the neighborhood. The doctor's theory that the doe remained behind the migrating drove in the spring to bring forth her young, is a very probable explanation of their being here now. No doubt these two islands serve as convenient stopping places for the deer going north in the spring and south in the fall.

For dinner we had deer soup and three fourths of a pound of pemmican. After dinner prepared the following record, which I shall deposit here in a tin case: —

SEMENOVSKI ISLAND, ARCTIC OCEAN,
Sunday, September 11, 1881.

This record of our arrival at and proposed departure from this island is left here in case of any search being made for us before we can place ourselves in communication with home.

The Jeannette, after drifting two winters in the pack ice, was crushed and sunk on the 12th June, 1881, in latitude N. $77^{\circ} 15'$ and longitude E. 155° , and the thirty-three persons composing her officers and crew succeeded in reaching this island yesterday afternoon, intending to proceed to-morrow morning toward the mouth of the Lena River in our three boats.

A record of our doings was left at Bennett Island (discovered by us) in latitude N. $76^{\circ} 38'$ and longitude E. $150^{\circ} 31'$, and one (before the loss of the ship) at Henrietta Island (discovered by us), in latitude N. $77^{\circ} 8'$, longitude E. $157^{\circ} 45'$; and a third was left in a boat-breaker on the ice, in latitude N. $77^{\circ} 18'$ and longitude E. $153^{\circ} 25'$.

We are all well, have had no scurvy, and hope with God's aid to reach the settlements on the Lena River during the coming week. We have yet about seven days' provisions—full rations.

GEORGE W. DE LONG, *Lieutenant U. S. Navy,*
Commanding Arctic Expedition.

The hunters all got back by eight P. M., but beyond seeing many tracks they came across nothing. At 6.30 P. M. we had supper, — ptarmigan soup and fried pemmican and tea. We shall get under way to-morrow morning.

CHAPTER XVII.

THE LENA DELTA.

12—30 *September*, 1881.

Under Way again. — The Boats separate. — Heavy Gale. — Shoal Water. — Wading Ashore. — The Prospect. — Preparations for March. — Copy of Record. — The Start. — Terribly Slow Progress. — The Last Can of Pemmican. — Divine Help. — Straggling. — Ericksen Breaking Down. — A River. — Huts. — Proposals to send for Relief. — Well done, Alexey! — A Respite. — A New Start. — Trying to Raft. — Perplexities of the Country. — Fox-Traps. — Enough left for Three Meals only. — Unfaltering Trust. — The River. — Saved again. — Shooting the Deer. — Ericksen's Condition. — A Moccasin Print. — Drowsiness. — In the Fork of a River. — Doubts as to Position. — Flying a Black Flag. — Amputation of Ericksen's Foot. — Failure of Game.

SEPTEMBER 12th, *Monday*. — Called all hands at five ; breakfasted at six. Fresh E. wind ; temperature 31°. Under way 7.30 ; course, south southwest (true) ; 8.40 abreast north end of Wassilewski Island ; 9.40 abreast south end of Wassilewski Island ; 11.30 came to alongside ice for dinner. Run by estimation, sixteen miles. Soundings, four and three quarter fathoms. Under way at 12.30. Round to against ice at four. Whaleboat stove. Under way at 4.15 ; freshening east northeast breeze. At nine P. M. lost sight of whaleboat ahead ; at ten P. M. lost sight of second cutter astern ; wind freshening to a gale. Step of mast carried away ; lowered sail and rode to sea anchor ; very heavy sea and hard squalls. Barometer falling rapidly.

September 13th, Tuesday. — Very heavy northeast gale all day until six P. M., when it moderated; very heavy squalls; tremendous sea. Boat shipping a good deal of water, she kept sea anchor abeam. At ten A. M. got out the sail and attempted to ride under the lee of it. After doing so very well for an hour, the sheet parted and we lost sail and yard. Barometer fell to 29.35 at 35°. In the afternoon made a sea anchor of oars and mast, and managed to ride out gale under their lee. After six P. M. wind and sea moderated rapidly; clouds broke away; moon and stars appeared, and auroral flashes. At eight P. M. set a jury sail made of a sled cover, and kept the boat away to the westward before the sea.

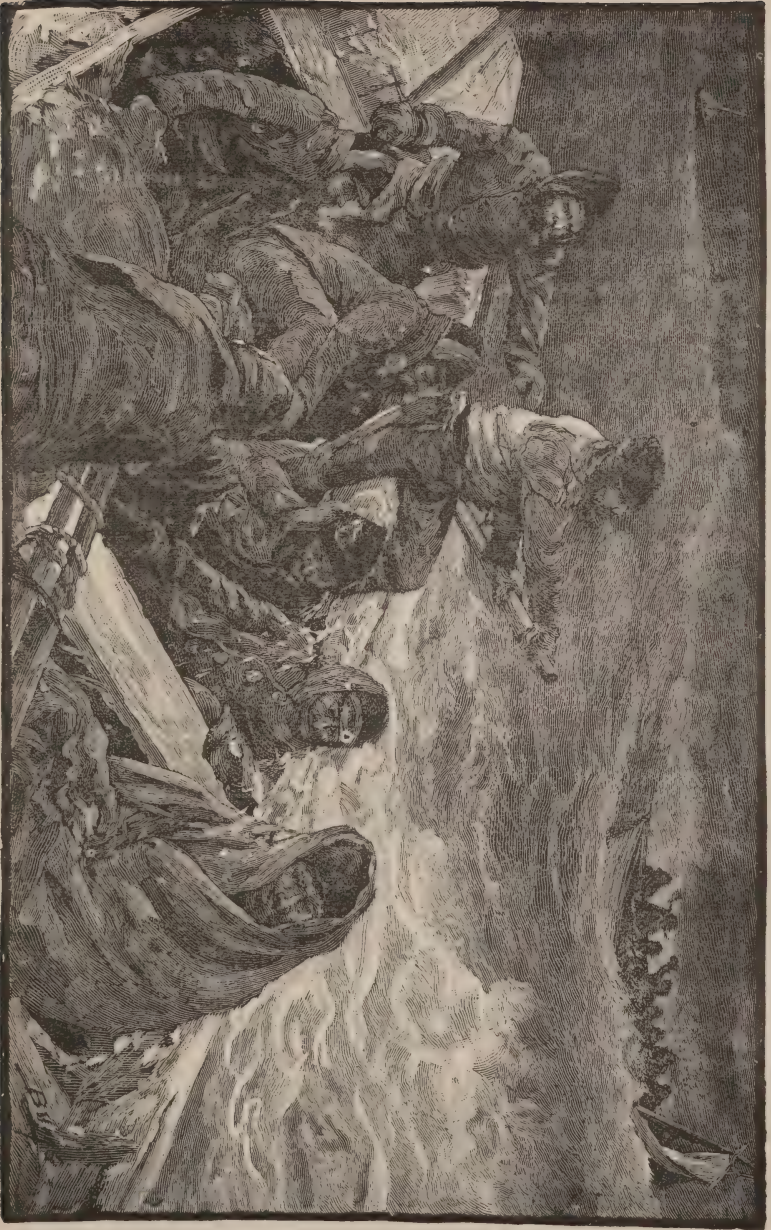
September 14th, Wednesday. — Wind ahead; sea moderating rapidly. Rising barometer. Towards noon the wind settled to about south. Boat making about a west (true) course of about one knot per hour. Nothing seen of either second cutter or whaleboat. Soundings in ten fathoms. Served out eight and a half pounds of ham instead of the pemmican rations at dinner.

September 15th, Thursday. — Light south winds; much swell but moderating rapidly. Ericksen got latitude at noon. My hands disabled since yesterday. Kept boat on port tack; making nothing better than west under jury sail; eight and a half fathoms; sewed two parts of jury sail together. Very little progress, not one half knot per hour.

September 16th, Friday. — At four A. M. calm. Sounded in six feet of water. Called everybody and got breakfast. At six got out six oars and pulled south. Seals numerous. Young ice met. At eight commenced to raise little lumps of land on port bow and ahead; at

Second Outter: Chipp.

Whaleboat: Melville.



First Outter: De Long.

THE SEPARATION OF THE BOATS IN THE GALE.

nine grounded. From this time until six P. M. struggling to get into water deep enough to float us sixteen inches; more than a mile from shore. Waited for tide to rise, but there seemed to be only two inches increase. Land line running east and west, low and flat. Finally, at six P. M. ran up to a piled-up mass of thin scales of ice in eighteen inches of water, and hung on to it. Got ice from it for cooking. Ice and water much fresher than anything from the sea.

September 17th, Saturday. — After a most miserable and uncomfortable night called all hands at six and got breakfast. Barometer 30°. At eight slipped from ice and tried on the starboard tack. Grounded at a few hundred yards. Tried port tack. Grounded again. Struggled back to ice by eleven. Made raft. Got dinner. Decided to unload and wade ashore. At one loaded raft with tents, cooking stoves, and boat-box, and though it was buoyed with two breakers it took the ground. First load started at 2.45, — everybody except doctor, Boyd, Ericksen, and myself. Water knee-deep; land one and one half miles off. Returned from first load at 4.15. Hauled boat farther inshore. Started second load (Collins and Sam remained behind disabled) 4.45. Second load landed and men back by 6.45. Hauled boat another drag inshore, then say one eighth of a mile distant. Got her in to one half of a mile distant. Then all got out and carried load ashore. I landed at eight P. M. Dark and snow-storm, but Collins had a good fire going. Sent everybody except doctor, Collins, Sam, Boyd, Ericksen, and self back for one more load, and at 10.20 had landed everything except boat, oars, mast, sled, and breakers. Got supper, — two pounds pig's feet additional. Negus chronometer stopped at about eleven P. M., — only

eight hours after winding. Pitched camp. No watch set. Chronometer reads 7h. 34m. 6s.

September 18th, Sunday. — Called all hands at eleven A. M. Got breakfast of tea and pemmican as soon as we could, and then the doctor commenced overhauling us generally. Prepared to make a large fire to dry us. The ground under us has been so wet all night that we are soaking wet as a rule. Occasionally our underclothes are only wet in patches, but as a rule we are wet, bags, clothes, and all.

Sent out afternoon to the boat, and brought in the alcohol, all clothing, boat-box, etc., and there was left nothing but the oars, mast, half boat cover, water breaker, etc. Had fires going all the time to dry our clothes. We must look our situation in the face and prepare to walk to a settlement.

For dinner had seven pounds of ham instead of pemmican, and for supper soup made from two ptarmigan and two pounds pig's feet with two pounds ham instead of pemmican. Snow, hail, and sleet, and strong wind. Piped down at nine. No watch set. Divine service at five P. M.

September 19th, Monday. — Called all hands at 6.30. Breakfast of tea and five pounds of tongue. This exhausts our canned meats, and now we have about three and a half days' rations, pemmican and plenty of tea.

I ordered preparations to be made for leaving this place after dinner, and as a beginning all sleeping-bags are to be left behind. Foot-nips may be made of them. List of things carried and left behind will be written in here: —

LEFT BEHIND.

1 sextant.	<i>Medical box, viz. —</i>
1 artificial horizon.	10 rolls bandages.
Mercury.	2 oz. opium.
1 almanac, 1881.	$\frac{1}{2}$ lb. cathartic pills.
1 useful table.	2 elastic trusses (double).
1 Chauvenet's Lunar and Eg.	1 case urinary instruments.
Alt.	1 small operating case (par-
1 comparing watch.	tial).
1 cooking stove.	1 roll lint.
14 mess pans.	1 lb. cotton batting.
1 cooking pot.	1 case sticking plaster.
1 cooking pan.	1 clinical thermometer.
1 box rock specimens.	Small tray empty vials.

THINGS TAKEN ALONG.

2 pocket cases complete.	30 sulph. zi. powders.
2 operating knives.	1 quart brandy.
2 small finger saws.	1 operating saw.
2 $\frac{1}{2}$ jars carbolized vaseline (four	1 hatchet.
oz. each).	1 pocket barometer.
6 oz. glycerine.	1 pocket compass.
6 oz. turpentine liniment.	1 thermometer case.
2 oz. laudanum.	1 prayer book.
2 oz. cathartic pills.	1 chart case.
2 oz. diarrhoea mixture.	4 tin cases.
1 oz. tincture capsicum.	Log books.
2 oz. carbolic acid.	Papers.
8 flannel bandages.	Journal.
$\frac{1}{2}$ roll lint.	1 pocket chronometer.
$\frac{1}{8}$ roll plaster.	1 Winchester rifle.
$\frac{1}{2}$ roll isinglass.	2 Remington rifles.
15 Dover's powders.	1 small Winchester rifle.

COPY OF RECORD LEFT IN INSTRUMENT BOX.

MONDAY, 19th of September, 1881.

LENA DELTA.

The following named fourteen persons belonging to the Jeannette (which was sunk by the ice on June 12, 1881, in latitude N. $77^{\circ} 15'$, longitude E. 155°) landed here on the evening of the 17th inst., and will proceed on foot this afternoon to try to reach a settlement on the Lena River: De Long, Ambler, Collins, Nindemann, Görtz, Ah Sam, Alexey, Erickson, Kaack, Boyd, Lee, Iversen, Noros, Dressler.

A record was left about half a mile north of the southern end of Semenovski Island buried under a stake. The thirty-three persons composing the officers and crew of the Jeannette left that island in three boats on the morning of the 12th inst. (one week ago). That same night we were separated in a gale of wind, and I have seen nothing of them since. Orders had been given in event of such an accident for each boat to make the best of its way to a settlement on the Lena River before waiting for anybody. My boat made the land in the morning of the 16th inst., and I suppose we are at the Lena Delta. I have had no chance to get sights for position since I left Semenovski Island. After trying for two days to get inshore without grounding, or to reach one of the river mouths, I abandoned my boat, and we waded one and a half miles ashore, carrying our provisions and outfit with us. We must now try with God's help to walk to a settlement, the nearest of which I believe to be ninety-five miles distant. We are all well, have four days' provisions, arms and ammunition, and are carrying with us only ship's books and papers, with blankets, tents, and some medicines; therefore, our chances of getting through seem good.

GEORGE W. DE LONG,

Lieut. U. S. Navy Commanding.

During forenoon Alexey shot a large gull, which we made into soup for dinner, with our second drawn tea and six ounces pemmican. At 2.45 went ahead, and at 4.30 stopped and camped. Loads too heavy, men used

up—Lee groaning and complaining, Ericksen, Boyd, and Sam hobbling. Three rests of fifteen minutes each were of no use. Road bad. Breaking through thin crust; young ice everywhere. Occasionally up to knees. Conclude to send back log-books, stove, two alcohol, one tent, binoculars. Built a roaring big fire, and dried ourselves while we ate supper. Then sent Nindemann back with Alexey and Dressler to deposit log-books. They returned at nine P. M., when we all crawled into our tents and tried to sleep. Bright sun all the afternoon. Light south wind. Toward eight P. M. became cloudy, and wind backed to S. E. and freshened.

September 20th, Tuesday. — Called all hands at 6.30. Slept better than I expected on our wooden beds. Woke up frequently to shiver with cold. Sick about the same, but no worse. At 8.05 got under way. Left No. 1 tent behind because we could not carry it. No. 6 tent is made of cotton, and sheds water better; and it is my intention to cut it at each end and use it as a coverlet for the fourteen of us.

I found that our progress was terribly slow. The sun shone brightly and enabled me to keep an idea of our course, generally to the southward; but so many ponds with thin ice and mossy swamps intervened that we were making a queer traverse table. The most serious trouble was with Ericksen, who kept us all back as he hobbled along a foot at a time. Frequent rests did him no good, and at 11.05 I was compelled to halt the party, for he was done up. Four miles made good. Boyd and Sam did very well, though unable to carry any weights. Every one of us seems to have lost all feeling in his toes, and some of us even half way up the feet. That terrible week in the boat has done us a great injury.

Ordered tea made and pemmican served out. We opened our last can (forty-five pounds), and in order to make it hold out as long as possible, I so cut it that it must suffice for four days' food. Then we are at the end of our provisions, and must eat the dog, unless Providence sends something in our way. When the dog is eaten — ?

I was much impressed, and derive great encouragement from an accident of last Sunday. Our Bible got soaking wet, and I had to read the epistle and gospel out of my prayer-book. According to my rough calculation it was the fifteenth Sunday after Trinity, and the gospel contained some promises which seemed peculiarly adapted to our condition.¹

During the forenoon we had almost got out of the ridges of drift-wood, and I began to be uneasy lest we should wander so far away from them as to jeopardize our tea and warmth. At 12.30 went ahead again, and almost immediately struck *deer tracks* comparatively fresh. Elated beyond expression, I pushed ahead, following them, and heading about south, and soon came to large masses of drift-wood again. Three traps of some kind were here found, but whether to catch deer, wolves, or foxes I cannot say. A fog was rising from the southward, and I began to be in hopes that we were close to the river, when a shout from the rear caused me to notice that my party was straggling out too much. Upon their closing up, I learned that Ericksen had lain down, desiring to be left. I rushed back, followed by the doctor, and, by rating the man soundly for his folly, got him on his feet again and drove him

¹ The passage is in Matthew vi. 24 : "Take no thought for your life, what ye shall eat, or what ye shall drink ; nor yet for your body, what ye shall put on," etc.



WADING ASHORE.

W. G. W. 8

before me. But his condition is serious indeed, and he can neither keep up with us nor be carried. Reaching anywhere in four days with him disabled is out of the question; and it looks as if I must send the doctor and Nindemann ahead for assistance.

Before getting Ericksen up to our halting place with the doctor, I went ahead to send Nindemann and Alexey on in the deer tracks, to see if we were close to a river mouth; but upon reaching the place at two P. M., I found they had gone in chase of four deer which had appeared in my absence. While waiting for results built a fire. At three Nindemann and Alexey returned, having seen a herd of seven or eight deer, but they were unable to get a shot. At 3.20 went ahead again. This time the doctor and I brought up the rear to prevent Ericksen giving up, and we succeeded in advancing him a mile by 4.20. Here we crossed what I consider a river mouth, from the enormous masses of wood piled up on its southern shore, and as I had instructed Mr. Collins, Nindemann, and Alexey to deposit their loads here, and proceed in quest of game, I announced this as the camp. If game can be obtained we are all right, but if not, here must some decision be made about sending forward for relief.

At 5.30 hunters returned, saw plenty of tracks but no deer. Supper at six. Light southeast wind. Barometer 29.87 at 50°. Temperature 29°. When we halted at noon for dinner a little snow-bird flew around us and finally lighted upon my flagstaff which I carry. Mr. Collins immediately exclaimed, "That is good luck, Captain." Such small things even are noticeable in our kind of life. During the afternoon we saw what I took to be a gate-post, with slots for fence-rails; but Ericksen says it was a loggerhead for a grain-boat or vessel of that kind.

Upon halting for supper we, of course, built a tremendous fire, for the cords of wood along the beach had no owner but ourselves. In front of this we sat and roasted, while our wet clothes steamed in clouds. Our beds we made of logs, and our coverings of our blankets, and after we were all down our half of the cut tent was hauled over us like a tarpaulin over merchandise. Day's walk, five miles.

September 21st, Wednesday. — During the night snow fell heavily, and the wind increased. Our tent cover blew away from us, owing to a mistake which we made of turning in with our feet to the fire and our heads to the wind. Besides this, we were all frequently awake to shake, for I must confess it was a very cold bed.

At six I called all hands. S. E. gale, snow and fog. At 7.30 we loaded up and went ahead until 11.30. Boyd and Sam made good progress, and Ericksen did better than yesterday, but still it was terribly slow going; four miles was all that we covered in the four hours. I followed the heavy timber on the south bank of the river, though we saw no water except when thin ice let us through knee-deep into swamp-grass and mud. On the northern bank there appeared no drift-wood. Numerous fox-traps were seen, some of them sprung. Deer tracks were seen in large number, evidently made by a large herd.

At eleven Nindemann, whom I had sent ahead of everybody to look for game, came up to me and reported that we had reached a river one hundred yards wide, with good, smooth ice along the shore. We had been running about a southwest course, and this river was in the same direction; but now the line of heavy timber was on the north side, just away from us. This gave

me no anxiety, however, for enough wood remained on our (the south) side to answer all our demands.

At 11.20 I halted and ordered dinner, which we were a long time in getting, owing to wet matches, damp wood, strong wind puffs, etc. To reach the smooth river ice we had to leave the swamp and drop waist deep in snow. A fox-trap was close by with a fox's head in it, but the body had been eaten or cut off close to the neck. Our plan of using one ration of tea for all three meals has received occasional shocks; as for instance, to-day a small can of salt had been, I find, carried in the tea-kettle for want of a better place, and Lee has capsized it among the tea-leaves.

At one went ahead again, and at 3.30 came to a bend in the river making south, and to our surprise two huts, one seemingly new. In view of the action I am about to take, I decided to remain here, and we entered in and took possession. Distance made good six miles, this one hundred and first day since we lost our ship. Is this Tscholbogoje? is now an important question, for if this pair of huts make a settlement, our chances of keeping on successfully are very slim indeed. According to my account we are now thirty-five miles away from the next *station!!* and eighty-seven miles from a probable settlement. We have two days' rations after to-morrow morning's breakfast, and we have three lame men who cannot make more than five or six miles a day; of course I cannot leave them, and they certainly cannot keep up with the pace necessary to take.

When I saw these two huts — one evidently new, and both habitable and intended for a prolonged residence — I concluded that this was a suitable place to halt the main body, and send on a couple of good walkers to make a forced march to get relief. The two I selected

were the doctor and Nindemann ; and I had a preliminary conversation with the former on the subject, giving him my views. He is to push on until he does come to a settlement, and can get back relief to us. And we are to remain here and try to eke out an existence with two days' rations drawn out to their fullest extent, and such chance game as may offer. Though loth to do anything which seems like abandoning us, he is willing enough to do anything that may give a chance for relief, and by to-morrow morning I shall have his orders perfected and my plans made. Go on we cannot just now, and here we can have at least heat and shelter. Seeing something across the river and farther down that looked like a signal-post or a fish-frame, I sent Nindemann along to look at it ; and some hut-like objects to the eastward being seen, I sent Alexey over to look at them. This was at four P. M. A flock of five small ducks had been swimming around in the river, and several rifle shots had been fired without effect. I had caused a strict search to be made around both huts for food of any kind, but nothing could be found. At six Nindemann returned. He found a gull in a trap and brought it in, but alas ! it was rotten. The trap had been set for a fox or a goose, and baited with fish. We ate our supper and crawled under our blankets. Two good berths in the new hut gave bedsteads to the doctor, Collins, Nindemann, and myself ; and ordering the fire to be thrown outside, and the house shut up to keep the heat in, I consigned myself to sleep. At 8.30 Alexey had not yet returned, and though I was anxious to have no one away from me, I could not doubt he would safely return. At nine P. M. a knock was heard outside, and Alexey's voice asking, " All asleep inside ? " and in an instant I was up. Sticking his head in the

door, Alexey said, "Captain, we got two reindeer;" and in he came bearing a hind quarter of meat. Sleep was at once forgotten. Fire was made, and cooking begun in both huts, and we consumed about one and one half pounds cooked meat each, finishing all that Alexey brought, except two tongues, before we cried enough.

Alexey went toward these seeming huts, and found they were in fact huts, but very old. While walking around and beyond them he saw deer traces so fresh as to make him think the animals were close at hand. He was in doubt as to incurring a scolding from me if he stayed away, or to take the chances of getting meat. He decided he would try for meat, and went on. Soon after a snow-squall he saw deer horns moving, and by strategy unsurpassed, crept upon a herd of fourteen, and at twenty-five yards' distance dropped two. The remainder at once left. Tickled to death, he cut off a hind leg, and cut out both tongues, and staggered in cold and wet. Well done, Alexey! The darkest hour is just before the dawn.

September 22d, Thursday.— The hut remained warm until toward daylight, when it began to grow chilly. Called all hands at 5.30, and had a pemmican breakfast, and at 6.45 sent out Nindemann, Alexey, and five men to bring in our two deer. This, of course, changes my plans. We can now remain here a day or two to let our sick people catch up, and while living upon deer meat on hand can search for more to cook and carry with us. The two remaining days' pemmican is shut up tight during our use of other food. Looking around our hut we can see traces of Russians or other civilized beings. A rude checker-board, wooden forks, pieces of pencil, etc., and other evidences of the use of tools by

somewhat skilled workmen. At noon light east breeze; temperature air 30°. Within the hut, at my berth in front of the fire, the thermometer stood at 70°.

At 1.50 Nindemann and his party returned, bringing in the two deer; seven hours' walking was necessary for them evidently. We immediately commenced getting dinner, and at three sat down to one and a half pounds each of fried steaks, liver, and heart. As soon as we were through dinner we had to commence preparing for supper, because, in our limited stock of cooking utensils, a pot, frying-pan, and pot cover, we can do but little at a time. Boiled down for two hours a lot of bones for soup, and served out one half pound meat for frying. At eight, therefore, we had soup, one and a half pints each, and a half pound fried meat, and at nine put out the fire and went to sleep, — saving our candle-ends for some emergency. Tea was dispensed with also, because the pot was in use for soup. The sick seem to be improving. Boyd is on the rapid mend, Sam slowly, and Ericksen is no worse.

This rest, and food, and shelter will no doubt restore their feet at the earliest moment, and I must simply wait and hope. They cannot move now, and we are so well off for deer meat (probably one hundred pounds clear meat) that the necessity for separating our party seems not a pressing matter.

September 23d, Friday. — Called all hands about 6.30. Breakfast, three quarters of a pound fried deer meat, one and a half pints tea, at eight.

At noon light S. W. breeze. Barometer 29.80 at 55°; temperature 25°. Appearance of high land to the southward. Dinner of soup and three quarters of a pound fried meat. From the surgeon's report of the condition of the sick men I have decided to move on to-morrow morning after breakfast.

Took an account of our deer meat on hand. Meat free from bone, fifty-four and a half pounds; meat on the bone, fourteen pounds; bones for soup, fifteen pounds. After we had served out twenty-two pounds meat on the bone for supper to-night, the fourteen pounds on the bone we shall have for breakfast in the morning, and the fifty-four and a half pounds clear meat we carry with us.

At three P. M. we each had one pint soup made from marrow bones. At six P. M. had supper of tea, one and a half pounds meat on bones, and then set to work boiling down remaining soup bones for breakfast.

September 24th, Saturday.—Called all hands at 4.20; at 5.20 had soup, and at six tea and one pound meat on bones. Temperature 27.5°; mild and pleasant. Commenced preparations for departure at seven. Completed record [of movements of the party], placed it in tinder box, and lashed it up on house-post inside. Started the sick ahead under the doctor's lead at 8.05, and at 8.20 I brought up the rear with Görtz, leaving my Winchester rifle in the hut as a surprise to the next visitor.

Followed along the bank of the river, rounding one creek and going across the ice of another, and proceeded until 11.20, by which time we had made good about three and a half miles to the southward, allowing for all crooks and turns. Passed the ruins of three huts. Upon rounding the creek, at the end of which these huts were situated, and reaching the river again, I was struck with the fact that it was no longer frozen over, quite a little sea was raised by the wind showing deeper water, and that the shores shelved rapidly outward. Discouraged at the slow pace at which the men staggered along under their loads, and worried by the

exhausted looks which I saw at each rest, it seemed to me that if I could make a raft we might get along faster or at least more easily. I concluded to try it, and while halting for dinner selected suitable logs for our frame. After dinner went to work again, but why proceed. At 5.40 P. M. our raft, wretched and frail for want of lashings, was finished, and at the risk of losing all our things we embarked and tried to get it out in mid-stream to send it along before the wind under sail. But a strong ebb tide was now running, the wind had grown lighter, and our raft was firmly grounded. In disgust I abandoned the whole thing, and we again loaded our backs and plodded on. I had sent the sick on with the doctor afoot, towards some huts which Alexey claimed he saw; but upon catching up with them at 6.40 I could see no huts, and Alexey now thought "other side river stop," and I halted the party, made a fire, and got supper. Wood apparently ended; all our trees being stuck in the banks and requiring much labor to get them out. Dried ourselves. One pound deer meat for dinner, each.

At ten made a rough bed of a few logs! wrapped our blankets around us and sought a sleep that did not come. Day's walk, five miles.

September 25th, Sunday. — A wretched night, no sleep, no rest, cold and stiff. Called all hands at 5.20; three quarters of a pound deer meat at 6.30. Started ahead at seven, and soon after crossed a creek, fortunately iced over. Good road, and by 11.25 had come, I think, six miles down the river. Halted for dinner. Read divine service. Made the unpleasant discovery that we had but eight pounds deer meat and two tongues remaining. Some error in weighing before starting, or in serving out. Ate all for dinner. Went

ahead again at 1.10, and, thank God, came in sight of two huts at four P. M. At 3.30 we had made four miles good, cutting off the nose of the face in the Delta. Here we had to take to the bluff, and the traveling was heavy, terribly so, still the pace was forced, and at 4.50, when the advance got in, they had covered two miles more, making six miles for the afternoon, or twelve miles for the day. But recollecting that we had no sleep last night, it has been a hard day's work for us. I arrived at 5.50, having remained behind to drive up Lee. A great trouble to-day was the way in which our feet balled up. Occasionally breaking through the ice our boots got wet and then collected snow and surface crust readily, which froze at once and made a man's feet as large and unwieldy as if walking in sand-bags. It is hard to make the chart reconcile with the country in some instances. Though I left water in cutting across the neck and reached water after crossing, yet we were all the time on a smooth, frozen surface with a small timber line on each side, and in one place the road had all the appearance of a dried river bed. Here holes were encountered, into one of which I and several others tumbled to our waist.

Fox-traps were seen every two hundred yards or so, baited with pieces of bird. Some of them were sprung, but most of them were all right. The plan seems to be to entice the fox within a pen by meat, in detaching which he dislodges a small upright and a log falls down on his back. One of our two huts had fallen to decay, and was uninhabitable. The other was large enough to cover us all, but it was very dirty. Some deer horns showed that game had been caught, some mouldy scraps within showed that the meat had been

eaten, and some wooden forks and plates showed that more civilized people than natives had lived in the hut. Several drying frames and fox-traps were around in the vicinity. The land bluff was probably twenty-five feet high. Supper at 6.30 — tea and four fourteenths of a pound of pemmican. Turned in at 7.30 P. M.

September 26th, Monday. — Called cooks at 5.30. Breakfasted at 6.30 (tea, four fourteenths pound pemmican). Doctor's report not so good. Ericksen has an ulcer on the sole of his foot, and, though he can yet walk on it, in a few days it will be too bad for him to use it at all.

At 7.30 set Nindemann and the men to work to build a raft for crossing the smaller stream, and sent Alexey along its bank for a mile or more to look for a chance means of fording or crossing on ice. No such crossing could be found, and at ten, our crazy raft being ready, we commenced to ferry over.

The first party consisted of Mr. Collins, Alexey, and Lee, with Nindemann and Kaack to ferry. They succeeded in reaching the other side by dint of hard paddling; for though the raft would stick in the mud six feet from shore, at ten feet no bottom could be got with a ten foot pole.

At 11.30 the raft was back, and I attempted to send a second load of five passengers this time instead of three; but it was too much, and I had to come down to three.

At 3.45 P. M. got the last load (the surgeon and Ericksen, with Görtz) over, and as soon as we could get our priceless lashings from the raft we had our dinner (four fourteenths of a pound pemmican and tea). This leaves us exactly three meals more food and the dog. But still the unfaltering trust in God which I have had

all along makes me hopeful that some relief may be afforded us.

At 4.30 went ahead again, and by 6.55 had made four miles. Darkness was now approaching, and I ordered a halt for the night. It is hard to tell whether we stopped on *the* river or not, for we came south south-west and southwest; and, according to my chart, *the* river should run west. We took *a* frozen stream south southwest for the sake of the walking, and then cut "across lots" to what I thought was *the* river. But we shall see in the morning. Stood by for a cold night, and no sleep.

September 27th, Tuesday. — After a cold and comfortable (and to nearly all hands sleepless) night, the cook made tea at daylight, and at 5.05 we had our breakfast, — four fourteenths pounds pemmican. One more meal left.

Last night at our supper one half ounce alcohol was added to our second cup of tea, to our advantage no doubt, but it has nauseated me somewhat this morning. At six we were ready to start, but Nindemann saw reindeer, and I sent him and Alexey in quest of them. They were nine in number, and coming toward the river, or down the wind.

Ericksen's foot in bad condition this morning. At eight we heard a shout and saw our two men on the eastern horizon. Sent five men out at once, and at 9.45 they arrived in camp, bringing a fine buck. Saved again! Eleven deer seen, — ten escaped.

I need hardly say how great the relief was to my overstretched mind. Our last meal was on hand when I sent Nindemann and Alexey off, and had they failed we would have been obliged to eat it without advancing a foot, and with eight miles more to make before com-

ing opposite to a possible settlement. Our provisions would consist of poor Snoozer.

Nindemann and Alexey crawled around to leeward of the herd, until they went as far back nearly as our ferry of yesterday. Here they got within one hundred yards and fired, Nindemann's Winchester failing to explode, but Alexey's Remington killing a fine buck, — as much as five men could drag in. At 10.30 fourteen hungry men commenced eating fried deer meat, and I must admit we ate three pounds apiece before we were satisfied. Then I called a halt in eating, and weighed what remained. We found ninety-eight pounds clear meat, free from bone, nineteen pounds neck (for soup), and enough meat on the ribs to make two meals alone. Besides this, there were the soup bones, heart, liver, brains, and tongue, — in fine, I think three days' rations, allowing one pound each for a meal. If ever Divine Providence was manifested in behalf of needy and exposed people, we are an instance of it. All that I need to make my present anxiety *nil* is some tidings of the other two boats and their occupants.

The ulcer in Ericksen's foot has sloughed away so much of the skin as to expose the sinews and muscles. The doctor fears that he may have to amputate one half, if not the whole, of both feet.

At 12.30 went ahead filled and comfortable, each of us, except Ericksen, shouldering about fifteen pounds of meat, in addition to his ordinary load. The doctor and myself had each a set of ribs on our backs, and as we trudged along all of us presented a queer spectacle, somewhat of a nature to surprise our friends could they see us. By four P. M. we had advanced about three and one half miles direct, but, by cutting across an angle we

no doubt saved a mile more, making along the river a distance of four and one half miles. Here, seeing lots of wood, and more beyond, and knowing how exhausted we were from want of sleep last night and our having loads to-day, I called a halt, ordered supper (nine pounds neck, seven pounds fried ribs), and made preparations for rigging our tents against the bank as a kind of shelter to crawl under.

We had had S. E. winds all day and thick snow, but upon halting the wind seemed to back to the east and grow very light. The river here seems to make a long stretch southwest. According to my reckoning we are only four and a half miles from a point opposite Sagastyr. To-morrow will show whether I am right and whether Sagastyr is a settlement. May God grant it is.

To our astonishment upon halting we found a mocasin print in the snow, extending from the water to the bluff. Alexey says it is about two days old. From the bluff we can see across the river three things which look like huts.

September 28th, Wednesday. — Called cook at five. All hands at 5.55. Breakfast, soup (neck ten pounds), ribs fourteen pounds, tea. Though last night was not so uncomfortable, for we were under the lee of a bank, and had our tents laid over us, we did not get much sleep. For a few hours we lay stupid from sheer exhaustion, and the rest of the night we were kept awake by the cold, and the shift of wind right along the beach. Our breakfast was warm and refreshing, and we got under way at eight. At 8.45, when I ordered the first rest, I was sure we had made a mile; and my surprise was great to find everybody fall asleep, myself included. We were evidently worn and jaded, and for every twenty minutes' march I rested ten minutes thereafter.

We saw the tracks of two men walking along the beach the way we had come ; and at 11.10 we came to an old hut, which apparently (from fresh embers and meat scraps) had been used last night. Here the river made a long bend to the right, and anxious to shelter and rest my weary party, I halted for dinner. A considerable distance ahead of us on our side of the river is another hut-like looking structure for to-night.

After getting my breath and resting a few moments, I took a look at the situation and I was considerably nonplused. Before us ran a river south southwest, and at right angles to it, or east southeast, ran a second. We were therefore in a fork, and in any case had to cross a wide (one fourth of a mile) river before proceeding on our journey. This involved a raft, and suitable timber was neither convenient or accessible, even if we had lashings enough, which we have not. I sent Alexey along the stream running east southeast, and when he came back he said it turned up more to the northward and grew wider. I am inclined to think we have reached the end of the Delta, and that the reason why it does not correspond with my chart is because the shoals of sixty years ago have become raised lands. Sagastyr, if there is such a place, is five miles southwest from us, if I am right, and the tracks of the men seen this morning would point at their coming from there.

If Chipp or Melville got through all right they would naturally send back to look for us, and these two men may have been on some such errand. At all events, we are too much fagged out to do anything more without some sleep, and I shall stay in this hut all night. We had dinner (ten pounds ribs, five and a half pounds heart and liver), and at 1.10 P. M. set Nindemann, with

Alexey and Görtz to patch up the hut and make canvas door, while the rest were put at work gathering wood for our use and for a signal fire this evening. I intend to light a big fire outside the hut in hopes it may attract attention.

At 5.30 we had supper (eight and one fourth pounds bones for soup, one half pound deer meat), and immediately commenced lying down. By eight P. M. I had got everybody turned in, our signal fire burning brightly, our hut closed up, and I went to sleep, worn out.

September 29th, Thursday. — One hundred and ninth day. Called the cook at six A. M. Fire had of course to be made, and at seven we sat down to breakfast; one half pound meat apiece and tea.

At eight sent Alexey along the river running to the eastward in quest of game, and at the same time to look for a chance of crossing it, or for a bend in it looking to the southward and westward. The other men were put at work gathering fire-wood. Exceptions: Nindemann, who was sent along the east river seeking for materials to build a raft; Görtz, who was put to work erecting a flagstaff for showing a black blanket, and in repairing our hut; and Boyd and Sam, who acted as our internal police, while the cook got water for dinner purposes.

When I turned in last night I was in hopes that I should find ice enough here this morning to cross the river on, for though I think we have reached the end of the Delta, I am not sure of it, and I do not like the idea of standing still. No boat, and no materials for building even a crazy raft. Water on both banks, and but few days' provisions. One does not like to feel he is caught in a trap. Poor Ericksen's condition becomes

more and more critical. The doctor tells me this morning that his foot is sloughing away very fast, and that unless he can very soon be given the care and medical treatment which only a prolonged stay at a settlement will admit, his life is in danger. From the symptoms of a couple of days back the doctor fears lockjaw may intervene and carry him off; and in fact, it seems hard to see how he can recover in any case. If we could move on, and I forced him along, it would probably shorten his life; if I remained here and kept everybody with me, Ericksen's days would be lengthened a little at the risk of our all dying from starvation. This is evidently a crisis in our lives. I can do nothing more. We cannot cross the water until it freezes, or until we are ferried across it. I may be mistaken in our position, and we may be still twelve miles from the Delta end. This river making to the east may be the river I thought we rafted over some days ago, and we may be that much out. Any raft that is built must be large enough to carry us all at one time, for in such deep water and strong winds, there can be no coming back and forth; and how can we secure enough logs together to float us, having only a few ends of lanyards from the mens' bundles? The doctor and Mr. Collins started out on a hunt, after breakfast, too, but beyond a ptarmigan or two they saw nothing.

At twelve had dinner; eight and one fourth pounds bone soup, and seven pounds meat. At 12.15 Alexey and Nindemann returned, having come together and proceeded in company about four miles along the river. According to Nindemann the river proceeds indefinitely east southeast. Two miles from us they came to a two-man hut, which seemed to have been recently occupied. A portion of fish found there

tasted to us fresh and good, both raw and cooked. About one and a half miles from us the river was freezing, and in a day or so might be fit to walk over; but no timber for a raft could be found. A few old deer tracks were seen, but no deer. Nothing encouraging in this forenoon's work.

I caused this morning a black flag to be displayed on poles lashed together, about twenty feet in height, but the weather is so thick I do not think it will attract anybody. A large gull was drawn toward it, and Alexey shot him, ensuring us gull soup for supper.

Parties out for wood after dinner. Alexey and Nindemann rigging fish-lines. Sam plucking and making ready gull. Cook chopping wood, and others repairing or patching our hut or their clothes. At six had supper, one half pint gull soup, one half pound fried meat. At dark built fires again on the point in hope of attracting attention; but the attention of whom? At eight turned in. The wind moderated considerably, and backed to W. N. W., and as the water smoothed down I was glad to see ice form on both rivers.

September 30th, Friday. — One hundred and tenth day. Called the cook at six A. M. Breakfast at 6.50. Tea and one half pound fried meat. Light west breeze. Barometer 30.10 at 65°. Temperature 16.5° at nine. The main river is covered over with a sheet of ice, and I have sent Nindemann to examine it for a crossing place. Our hut remains comfortable for the first hours of the night, but towards daylight it becomes so cold and uncomfortable that sleep is out of the question. Boyd and Sam are discharged from the sick-list to duty. Ericksen is no better, and it is a foregone conclusion that he must lose four of the toes of his right foot, and one of his left foot. The doctor commenced slicing

away the flesh after breakfast, fortunately without pain to the patient, for the forward part of the foot is dead ; but it was a heart-rending sight to me, the cutting away of bones and flesh of a man whom I hoped to return sound and whole to his friends. May God pity us, and grant that this is the only mishap that is to attend the entire expedition. Now, of course, the man must be dragged, for his walking is out of the question. At the present daily decrease in temperature we shall not have to wait long for the freezing over of the river. Nindemann and Alexey upon their return report they crossed the east river about one and a half miles from here.

At twelve had dinner ; seven pounds stew, or one half pound each. I know this is not enough food per day, one and a half pounds, for I am certainly hungry, and I do not have even the work of bringing the wood, which the men have. But our deer meat will last just three days at one half pound a meal, and I cannot increase the issue.

After dinner I sent Alexey on a deer hunt ; Mr. Collins on a general short hunt ; the men for fire-wood, and Nindemann was put at making a sled-litter to carry Ericksen. The doctor thinks the latter cannot live unless we are fortunate enough to make a settlement within two or three days. Alas ! alas !

By six P. M. Mr. Collins and Alexey both returned empty-handed. Alexey had gone, he thinks, about nine miles, and saw nothing except old deer tracks.

Supper, one half pound deer meat and tea. Fire going on our signal hill as usual. All abed by eight P. M., our dirty hovel, unfit for a dog at home, seeming a palace, because of the shelter it gives.

DEER ACCOUNT — LENA DELTA.

Sept. 21st	.	.	.	.	.	21 lbs
22d	.	.	.	.	.	21
"	.	.	.	.	.	7
"	Bones	.	.	.	.	8
23d	.	.	.	.	.	11
"	.	.	.	.	.	11
"	Bones	.	.	.	.	7
"	"	.	.	.	.	9
"	"	.	.	.	.	22
24th	.	.	.	.	.	14
"	Carry	.	.	.	.	54
"	Bones	.	.	.	.	15
Two deer.	Meat clear	.	.	.	.	96
	Meat and bones	.	.	.	.	65
	Bones	.	.	.	.	39
	Total	.	.	.	.	200
Sept. 27th.	One deer, buck.	Meat clear				98
	Neck	.	.	.	.	19
	Heart and liver	.	.	.	.	5½
	Soup bones	.	.	.	.	16½
	Ribs.	.	.	.	.	28
	First meal (say)	.	.	.	.	42
	Total	.	.	.	.	209
Sept. 27th,	10 A. M., say	.	.	.	.	42
	Supper, Neck	.	.	.	.	9
	Ribs	.	.	.	.	3½
28th,	Breakfast, Neck	.	.	.	.	10
	Ribs	.	.	.	.	14
	Dinner, Rib	.	.	.	.	10½
	Heart and liver	.	.	.	.	5½
	Supper, Bones	.	.	.	.	8¼
	Meat	.	.	.	.	7
29th,	Breakfast, Meat	.	.	.	.	7

Dinner, Meat	7 lbs.
Bones	8
Supper, Gull soup.	
Meat	7
30th, Breakfast, Meat	7
Dinner, Meat	7



Head of a Siberian Reindeer.

CHAPTER XVIII.

THE FATAL MONTH.

October, 1881.

The Hundred and Eleventh Day. — Crossing the River. — Halting on a Bluff. — Cold Nights. — Weakness. — A Man's Track Seen. — Huts in the Distance. — Uncertainty. — Disappointment. — The Hut becomes a Mound. — Camping in the Face of the Bluff. — The Dog Killed. — A Fearful Night. — Under Cover of a Hut. — Extremity of the Party. — Speculations as to Position. — Death of Ericksen. — Burial. — Final Start Without Food save Alcohol. — Three Miles More. — The Effect of Alcohol. — Nindemann and Noros Sent Ahead for Relief. — A Spoonful of Glycerine for Supper. — Arctic Willow. — Staggering Forward. — Alexey Dies. — Death of Kaack and Lee. — No Foot Gear. — Iversen Dead. — The Last Recorded Deaths.

OCTOBER 1st, *Saturday*. — One hundred and eleventh day, and a new month. Called all hands as soon as the cook announced boiling water, and at 6.45 had our breakfast; one half pound of deer meat and tea. Sent Nindemann and Alexey to examine main river, other men to collect wood. The doctor resumed the cutting away of poor Ericksen's toes this morning. No doubt it will have to continue until half his feet are gone, unless death ensues, or we get to some settlement. Only one toe left now. Temperature 18°.

At 7.30 Nindemann and Alexey were seen to have crossed, and I immediately sent men to carry one load over.

Left the following record: —

SATURDAY, October 1, 1881.

Fourteen of the officers and men of the U. S. Arctic Steamer Jeannette reached this hut on Wednesday, September 28th, and having been forced to wait for the river to freeze over, are proceeding to cross to the west side this A. M. on their journey to reach some settlement on the Lena River. We have two days' provisions, but having been fortunate enough thus far to get game in our pressing needs, we have no fear for the future.

Our party are all well, except one man, Ericksen, whose toes have been amputated in consequence of frost-bite. Other records will be found in several huts on the east side of this river, along which we have come from the northward.

[List of party.]

GEORGE W. DE LONG,
Lieutenant U. S. Navy, Commanding Expedition.

At 8.30 we made the final trip, and got our sick man over in safety. From there we proceeded until 11.20, dragging our man on the sled. Halted for dinner; one half pound meat and tea each. At one went ahead again until 5.05.

Actually under way: 8.30 to 9.15, 9.30 to 10.20, 10.30 to 11.20, 1.00 to 1.40, 1.50 to 2.10, 2.20 to 2.40, 3.00 to 3.25, 3.35 to 4.00, 4.15 to 4.35, 4.45 to 5.05. Total, 5h. 15m. At least two miles an hour. Distance made good ten to twelve miles.

And where are we? I think at the beginning of the Lena River at last. "Sagastyr" has been to us a myth. We saw two old huts at a distance, and that was all, but they were out of our reach, and the day not half gone. Kept on ice all the way, and therefore I think we were over water, but the stream was so narrow and so crooked that it never could have been a navigable water. My chart is simply useless. I must go on plodding to the southward, trusting in God to guide me

to a settlement, for I have long since realized that we are powerless to help ourselves.

A bright, calm, beautiful day. Bright sunshine to cheer us up, an icy road, and one day's rations yet. Boots frozen, of course, and balled up. No hut in sight, and we halt on a bluff to spend a cold and comfortless night. Supper one half pound meat and tea. Made a rousing fire, built a log bed, set a watch (two hours each) to keep the fire going, and at eight P. M. crawled into our blankets.

October 2d, Sunday. — I think we all slept fairly well until midnight; but from that time it was so cold and uncomfortable that sleep was out of the question. At 4.30 we were all out and in front of the fire, daylight just appearing. Ericksen kept talking in his sleep all night, and effectually kept those awake who were not already awakened by the cold.

Breakfast five A. M. One half pound meat and tea. Bright, cloudless morning. Light N. airs. At seven went ahead, following frozen water wherever we could find it, and at 9.20 I feel quite sure we have gone some distance on the main river. I think our gait was at least two miles an hour, and our time under way two hours four minutes. I call our forenoon work at least six miles: 7.00 to 7.35, 7.45 to 8.05, 8.15 to 8.30, 8.40 to 8.50, 9.20 to 9.40, 9.50 to 10.12, 10.22 to 10.40, 10.55 to 11.15. Dinner camp. 1.00 to 1.30, 1.40 to 2.00, 2.15 to 2.35, 2.45 to 3.00, 3.20 to 3.40, 3.50 to 4.05, 4.15 to 4.20.

Divine service before dinner. Dinner one half pound meat and tea. Started ahead at one P. M., and by 4.15 had completed two marching hours and made four miles. I was much bewildered by the frequent narrowing of the river to a small vein of ice, and the irregular ram-

bling way in which it ran. Frequently it led us into a sand bank or deep snow, and our floundering around was both exhaustive of energy and consumptive of time. There is no use denying it, we are pretty weak. Our food is not enough to keep up our strength, and when we lose a night's sleep we feel it keenly. I had several bad falls on the ice this afternoon which shook me up pretty badly. A freshening N. E. wind had blown the efflorescence off the ice, and left smooth, clear spots as clear as glass. Frozen boots are but poor foot gear, and besides cramping the feet, are like boots of iron in walking. Slip, slide, and down you are on your back.

At 4.05 P. M. I saw more wood than we had sighted since our dinner camp, and but little ahead. I therefore called a halt and "camped," *i. e.*, sat down, made a fire and got supper. Then we stood by for a second cold and wretched night. There was so much wind that we had to put our tent halves up for a screen, and sit shivering in our half blankets.

October 3d, Monday. — One hundred and thirteenth day. At midnight it was so fearfully cold and wretched that I served out tea to all hands, and on that we managed to struggle along until five A. M., when we ate our last deer meat and had more tea. Our remaining food now consists of four fourteenths pounds pemmican each, and a half-starved dog. May God again incline unto our aid. How much farther we have to go before reaching a shelter or a settlement, He alone knows.

Brisk wind. Ericksen seems failing. He is weak and tremulous, and the moment he closes his eyes talks incessantly in Danish, German, and English. No one could sleep even if our other surroundings permitted.

For some cause my watch stopped at 10.45 last night while one of the men on watch had it. I set it as near as I could come to the time by guessing, and we must run by that until I can do better. Sun rose yesterday morning at 6.40 by the watch when running all right: 7.05 to 7.40 (35 m.), 7.50 to 8.20 (30 m.), 8.30 to 9.00 (30 m.), 9.15 to 9.35 (20 m.), 9.50 to 10.10 (20 m.), 10.25 to 10.40 (15 m.), 11.00 to 11.20, 11.30 to 11.50, 11.50 dinner — 1 h. 55 m. — 2 h. 35 m., say five miles.

Our forenoon's walk I put as above at five miles. Some time and distance was lost by crossing the river upon seeing numerous fox-traps. A man's track was also seen in the snow, bound south, and we followed it until it crossed the river to the west bank again. Here we were obliged to go back in our tracks, for the river was open in places, and we could not follow the man's track direct. Another of the dozen shoals which infest the river swung us off to the eastward, too, and I hastened to get on the west bank again, reaching there at 11.50 for dinner. Our last four fourteenths pound pemmican.

At 1.40 got under way again and made a long fleet until 2.20. While at the other side of the river Alexey said he saw a hut, and during our dinner camp he again saw it. Under our circumstances my desire was to get to it as speedily as possible. As Alexey pointed out it was on the left bank of the river of which we were now on the right side looking south. But a sand bank gave us excellent walking for a mile, until we took to the river ice and got across it diagonally. Here, at 2.20, I called a rest, and Alexey mounted the bluff to take a look again. He now announced that he saw a second hut about one and a quarter miles

back from the coast, the first hut being about the same distance south and on the edge of the bluff. The heavy dragging across country of a sick man on a sled made me incline to the hut on the shore, since, as the distance was about the same, we could get over the ice in one third of the time. Nindemann, who climbed the bluff, while he saw that the object inland was a hut, was not so confident about the one on the shore. Alexey, however, was quite positive, and not seeing very well myself I unfortunately took his eyes as best and ordered an advance along the river to the southward. Away we went, Nindemann and Alexey leading, and had progressed about a mile when, splash! in I went through the ice up to my shoulders before my knapsack brought me up. While I was crawling out, in went Görtz to his neck about fifty yards behind me, and behind him in went Mr. Collins to his waist. Here was a time. The moment we came out of the water we were one sheet of ice, and danger of frost-bite was imminent. Along we hobbled, however, until we came, at 3.45, abreast the point on which the hut was seen. Here Nindemann climbed the bluff, followed by the doctor. At first the cry was, "All right, come ahead," but no sooner were we all up than Nindemann shouted, "There is no hut here." To my dismay and alarm nothing but a large mound of earth was to be seen, which, from its regular shape and singular position would seem to have been built artificially for a beacon; so sure was Nindemann that it was a hut that he went all around it looking for a door, and then climbed on top to look for a hole in the roof. But of no avail. It was nothing but a mound of earth. Sick at heart I ordered a camp to be made in a hole in the bluff face, and soon before a roaring fire we were dry-

ing (and burning) our clothes, while the cold wind ate into our backs.

And now for supper! Nothing remained but the dog. I therefore ordered him killed and dressed by Iversen, and soon after a kind of stew was made of such parts as could not be carried, of which everybody except the doctor and myself eagerly partook. To us two it was a nauseating mess and — but why go on with such a disagreeable subject. I had the remainder weighed, and I am quite sure we had twenty-seven pounds. The animal was fat and — as he had been fed on pemmican — presumably clean, but —

Immediately upon halting I had sent off Alexey with his gun toward the hut inland, to determine whether that was a myth like our present one. He returned about dark, certain that it was a large hut, for he had been inside of it, and had found some deer meat, scraps, and bones. For a moment I was tempted to start everybody for it, but Alexey was by no means sure he could find it in the dark, and if we lost our way we should be worse off than before. We accordingly prepared to make the best of it where we were.

We three wet people were burning and steaming before the fire. Collins and Görtz had taken some alcohol, but I could not get it down. Cold, wet, with a raw N. W. wind impossible to avoid or screen, our future was a wretched, dreary night. Ericksen soon became delirious, and his talking was a horrible accompaniment to the wretchedness of our surroundings. Warm we could not get, and getting dry seemed out of the question. Nearly everybody seemed dazed and stupefied, and I feared that some of us would perish during the night. How cold it was I do not know, for my last thermometer was broken in my many falls on the

ice, but I think it must have been below zero. A watch was set to keep the fire going and we huddled around it, and thus our third night without sleep was passed. If Alexey had not wrapped his sealskin around me and sat down alongside of me to keep me warm by the heat of his body, I think I should have frozen to death. As it was I steamed, and shivered, and shook. Ericksen's groans and rambling talk rang out on the night air, and such a dreary, wretched night I hope I shall never see again.

October 4th, Tuesday. — One hundred and fourteenth day. At the first approach of daylight we all began to move around, and the cook was set to work making tea. The doctor now made the unpleasant discovery that during the night Ericksen had got his gloves off and that now his hands were frozen. Men were at once set to work rubbing them, and by six A. M. we had so far restored circulation as to risk moving the man. Each one had hastily swallowed a cup of tea, and got his load in readiness. Ericksen was quite unconscious, and we lashed him on the sled. A S. W. gale was blowing, and the sensation of cold was intense; but at six A. M. we started, made a forced fleet of it, and at eight A. M. had got the man and ourselves, thank God, under the cover of a hut large enough to hold us. Here we at once made a fire, and for the first time since Saturday morning last got warm.

The doctor at once examined Ericksen and found him very low indeed. His pulse was very feeble, he was quite unconscious, and under the shock of the exposure of the past night he was sinking very fast. Fears were entertained that he might not last many hours, and I therefore called upon every one to join with me in reading the prayers for a sick person before

we sought any rest for ourselves. This was done in a quiet and reverent manner, though I fear my broken utterances made but little of the service audible. Then setting a watch we all, except Alexey, laid down to sleep at ten A. M. Alexey went off to hunt, but returned at noon wet, having broken through the ice and fallen in the river.

At six P. M. all roused up, and I considered it necessary to think of some food for my party. Half a pound of dog was fried for each one and a cup of tea given, and that constituted our day's food. But we were so grateful that we were not exposed to the merciless S. W. gale that tore around us that we did not mind short rations.

October 5th, Wednesday. — One hundred and fifteenth day. The cook commenced at 7.30 to get tea, made from yesterday's tea leaves. Nothing can be served out to eat until evening. One half pound dog per day is our food until some relief is afforded us. Alexey went off hunting again at nine, and I set the men to work collecting light sticks enough to make a flooring for the house, for the frozen ground thawing under everybody has kept them damp and wet and robbed them of much sleep.

S. W. gale continues. Mortification has set in in Ericksen's leg and he is sinking. Amputation would be of no use, for he would probably die under the operation. He is partially conscious. At twelve Alexey came back, having seen nothing. He crossed the river this time, but unable longer to face the cold gale was obliged to return.

I am of the opinion that we are on Tit Ary Island, on its eastern side, and about twenty-five miles from Ku Mark Surka, which I take to be a settlement. This

is a last hope, for our Sagastyr has long since faded away. The hut in which we are is quite new, and clearly not the astronomical station marked on my chart. In fact this hut is not finished, having no door and no porch. It may be intended for a summer hut, though the numerous set fox-traps would lead me to suppose that it would occasionally be visited at other times. Upon this last chance and one other seem to rest all our hopes of escape, for I can see nothing more to be done. As soon as this gale abates I shall send Nindemann and one other man to make a forced march to Ku Mark Surka for relief. At six P. M. served out one half pound of dog meat and second-hand tea, and then went to sleep.

October 6th, Thursday. — One hundred and sixteenth day. Called all hands at 7.30. Had a cup of third-hand tea with one half ounce of alcohol in it. Everybody very weak. Gale moderating somewhat. Sent Alexey out to hunt. Shall start Nindemann and Noros at noon to make the forced march to Ku Mark Surka. At 8.45 A. M. our messmate Ericksen departed this life. Addressed a few words of cheer and comfort to the men. Alexey came back empty-handed. Too much drifting snow. What in God's name is going to become of us, — fourteen pounds dog meat left, and twenty-five miles to a possible settlement? As to burying Ericksen, I cannot dig a grave, for the ground is frozen and we have nothing to dig with. There is nothing to do but to bury him in the river. Sewed him up in the flaps of the tent, and covered him with my flag. Got tea ready, and with one half ounce alcohol we will try to make out to bury him. But we are all so weak that I do not see how we are going to move.

At 12.40 P. M. read the burial service and carried our

departed shipmate's body down to the river, where, a hole having been cut in the ice, he was buried; three volleys from our two Remingtons being fired over him as a funeral honor.

A board was prepared with this cut on it: —

IN MEMORY

H. H. ERICKSEN,

OCT. 6, 1881.

U. S. S. Jeannette.

and this will be stuck in the river bank abreast his grave.

His clothing was divided up among his messmates. Iversen has his Bible and a lock of his hair. Kaack has a lock of his hair.

Supper at five P. M. — one half pound dog meat and tea.

October 7th, Friday. — One hundred and seventeenth day. Breakfast, consisting of our last one half pound dog meat and tea. Our last grain of tea was put in the kettle this morning, and we are now about to undertake our journey of twenty-five miles with some old tea-leaves and two quarts alcohol. However, I trust in God, and I believe that He who has fed us thus far will not suffer us to die of want now.

Commenced preparations for departure at 7.10. Our Winchester rifle being out of order is, with one hundred and sixty-one rounds ammunition, left behind. We have with us two Remingtons and two hundred and forty-three rounds ammunition. Left the following record in the hut: —

FRIDAY, *October 7, 1881.*

The undermentioned officers and men of the late U. S. Steamer *Jeannette* are leaving here this morning to make a

forced march to Ku Mark Surka, or some other settlement on the Lena River. We reached here on Tuesday, October 4th, with a disabled comrade, H. H. Ericksen (seaman), who died yesterday morning, and was buried in the river at noon. His death resulted from frost-bite and exhaustion, due to consequent exposure. The rest of us are well, but have no provisions left — having eaten our last this morning.

Under way at 8.30 and proceeded until 11.20, by which time we had made about three miles. Here we were all pretty well done up, and, moreover, seemed to be wandering in a labyrinth. A large lump of wood swept in by an eddy seemed to be a likely place to get hot water, and I halted the party. For dinner we had one ounce alcohol in a pot of tea. Then went ahead, and soon struck what seemed like the river again. Here four of us broke through the ice in trying to cross, and fearing frost-bite I had a fire built on the west bank to dry us. Sent Alexey off meanwhile to look for food, directing him not to go far nor to stay long; but at 3.30 he had not returned, nor was he in sight. Light S. W. breeze, hazy; mountains in sight to southward.

At 5.30 Alexey returned with one ptarmigan, of which we made soup, and with one half ounce alcohol had our supper. Then crawled under our blankets for a sleep. Light W. breeze; full moon; starlight. Not very cold. Alexey saw river a mile wide with no ice in it.

October 8th, Saturday. — One hundred and eighteenth day. Called all hands at 5.30. Breakfast, one ounce alcohol in a pint of hot water. Doctor's note: Alcohol proves of great advantage; keeps off craving for food, preventing gnawing at stomach, and has kept up the strength of the men, as given, — three ounces



NINDEMANN AND NOROS IN SEARCH OF HELP

per day as estimated, and in accordance with Dr. Anstie's experiments.

Went ahead until 10.30; one ounce alcohol 6.30 to 10.30; five miles; struck big river; 11.30 ahead again; sand bank. Meet small river. Have to turn back. Halt at five. Only made advance one mile more. Hard luck. Snow; S. S. E. wind. Cold camp; but little wood; one half ounce alcohol.

October 9th, Sunday. — One hundred and nineteenth day. All hands at 4.30 one ounce alcohol. Read divine service. Send Nindemann and Noros ahead for relief; they carry their blankets, one rifle, forty rounds ammunition, two ounces alcohol. Orders to keep west bank of river until they reach settlement. They started at seven; cheered them. Under way at eight. Crossed creek. Broke through ice. All wet up to knees. Stopped and built fires. Dried clothes. Under way again at 10.30. Lee breaking down. At one strike river bank. Halt for dinner, — one ounce alcohol. Alexey shot three ptarmigans. Made soup. We are following Nindemann's track, though he is long since out of sight. Under way at 3.30. High bluff. Ice running rapidly to northward in river. Halt at 4.40 upon coming to wood. Find canoe. Lay our heads on it and go to sleep; one half ounce alcohol for supper.

October 10th, Monday. — One hundred and twentieth day. Last half ounce alcohol at 5.30; at 6.30 send Alexey off to look for ptarmigan. Eat deerskin scraps. Yesterday morning ate my deerskin foot-nips. Light S. S. E. airs. Not very cold. Under way at eight. In crossing creek three of us got wet. Built fire and dried out. Ahead again until eleven. Used up. Built fire. Made a drink out of the tea-leaves from alcohol bottle. On again at noon. Fresh S. S. W. wind, drift-

ing snow, very hard going. Lee begging to be left. Some little beach, and then long stretches of high bank. Ptarmigan tracks plentiful. Following Nindemann's tracks. At three halted, used up; crawled into a hole in the bank, collected wood and built fire. Alexey away in quest of game. Nothing for supper except a spoonful of glycerine. All hands weak and feeble, but cheerful. God help us.

October 11th, Tuesday. — One hundred and twenty-first day. S. W. gale with snow. Unable to move. No game. One spoonful glycerine and hot water for food. No more wood in our vicinity.

October 12th, Wednesday. — One hundred and twenty-second day. Breakfast; last spoonful glycerine and hot water. For dinner we tried a couple of handfuls of Arctic willow in a pot of water and drank the infusion. Everybody getting weaker and weaker. Hardly strength to get fire-wood. S. W. gale with snow.

October 13th, Thursday. — One hundred and twenty-third day. Willow tea. Strong S. W. wind. No news from Nindemann. We are in the hands of God, and unless He intervenes we are lost. We cannot move against the wind, and staying here means starvation. Afternoon went ahead for a mile, crossing either another river or a bend in the big one. After crossing, missed Lee. Went down in a hole in the bank and camped. Sent back for Lee. He had turned back, lain down, and was waiting to die. All united in saying Lord's Prayer and Creed after supper. Living gale of wind. Horrible night.

October 14th, Friday. — One hundred and twenty-fourth day. Breakfast, willow tea. Dinner, one half teaspoonful sweet oil and willow tea. Alexey shot one ptarmigan. Had soup. S. W. wind, moderating.

October 15th, Saturday. — One hundred and twenty-fifth day. Breakfast, willow tea and two old boots. Conclude to move on at sunrise. Alexey breaks down, also Lee. Come to empty grain raft. Halt and camp. Signs of smoke at twilight to southward.

October 16th, Sunday. — One hundred and twenty-sixth day. Alexey broken down. Divine service.

October 17th, Monday. — One hundred and twenty-seventh day. Alexey dying. Doctor baptized him. Read prayers for sick. Mr. Collins' birthday — forty years old. About sunset Alexey died. Exhaustion from starvation. Covered him with ensign and laid him in the crib.

October 18th, Tuesday. — One hundred and twenty-eighth day. Calm and mild, snow falling. Buried Alexey in the afternoon. Laid him on the ice of the river, and covered him over with slabs of ice.

October 19th, Wednesday. — One hundred and twenty-ninth day. Cutting up tent to make foot gear. Doctor went ahead to find new camp. Shifted by dark.

October 20th, Thursday. — One hundred and thirtieth day. Bright and sunny, but very cold. Lee and Kaack done up.

October 21st, Friday. — One hundred and thirty-first day. Kaack was found dead about midnight between the doctor and myself. Lee died about noon. Read prayers for sick when we found he was going.

October 22d, Saturday. — One hundred and thirty-second day. Too weak to carry the bodies of Lee and Kaack out on the ice. The doctor, Collins, and I carried them around the corner out of sight. Then my eye closed up.

October 23d, Sunday. — One hundred and thirty-third day. Everybody pretty weak. Slept or rested all day,

Friday October 21
131st day. Kaack was found dead
about midnight between the Doctor
and myself -

Lee died about noon -
Read prayers for sick when he found
he was going.

Saturday October 22nd
132^d day. Too weak to carry the bodies of Lee
and Kaack out on the ice. The Doctor, Collins and
I carried them around the corner out of sight. Then
my eye closed up.

Sunday October 23^d
133^d day. Everybody pretty weak. Slept or rested all
day and then managed to get enough wood in before
dark. Read part of Divine Service - Suffering in
our feet - No foot gear.

Monday October 24th
134th day. A hard night.

Tuesday October 25th

135th day.

Wednesday October 26th

136th day.

Thursday October 27th

137th day.

Iverson broken down

Friday October 28th

138th day.

Iverson died during early morning.

Saturday Oct 29.

139th day - Dressler died during night

Sunday Oct 30 -

140th day - Boyd & Gertz died

during night - Mr Collins dying

and then managed to get enough wood in before dark. Read part of divine service. Suffering in our feet. No foot gear.

October 24th, Monday. — One hundred and thirty-fourth day. A hard night.

October 25th, Tuesday. — One hundred and thirty-fifth day.

October 26th, Wednesday. — One hundred and thirty-sixth day.

October 27th, Thursday. — One hundred and thirty-seventh day. Iversen broken down.

October 28th, Friday. — One hundred and thirty-eighth day. Iversen died during early morning.

October 29th, Saturday. — One hundred and thirty-ninth day. Dressler died during night.

October 30th, Sunday. — One hundred and fortieth day. Boyd and Görtz died during night. Mr. Collins dying.



Captain De Long's Note-Books and Map.

CHAPTER XIX.

NINDEMANN AND NOROS.

9 October — 2 November, 1881.

Captain De Long's Instructions. — They start on their Forced March to the Southward. — They shoot a Ptarmigan and miss Deer. — Arctic Willow Tea and Boot-soles. — Camping in the Snow. — Loss of Alcohol. — A Hut. — Refuge from the Storm. — Struggling against the Wind. — Crossing Streams. — Another Hut, and a Burial Place. — Camping in a Crevice. — Reduced to Seal-skin from Pantaloons. — Making for the Mountains. — Miserable Shelter. — A Deserted Settlement. — A Needed Refuge. — Discovered by a Native. — Carried to a Camp. — Their Journey Southward. — Impossibility of Communication. — Ku Mark Surka. — Bulun. — The Telegraphic Message. — The Appearance of Chief-Engineer Melville.

THE brief record in which Captain De Long recites the experience of his party after landing upon the coast is so calm and reserved, that the reader may easily fail to recognize some of the extreme hardships which were endured, and the difficulties which assailed the men. So weak were they after their terrible exposure in the boat that they could not raise their legs to break through the young ice when wading to the shore, but were compelled to push through it as they moved feebly along. The land moreover on which they landed was a vast morass, which afforded no sure foothold. When the weather was mild the surface was spongy and wet; when the frost seized the ground, or snow fell, the walk-

ing was equally hard. The men slipped at every step, so that every mile they made was doubled in exertion.

Their track moreover was made in great uncertainty. No chart had been laid down of this desolate region, and indeed it would seem impossible to make any which would not be falsified by the changes which every fresh season brought. The fullest chart laid down only eight mouths to the Delta, but two hundred and ten have been counted by those who traversed the coast in the searches which followed the fateful voyage of the Jeannette. All the low land of the Delta is yearly covered with ice and water when the rivers break up, and the whole country is ploughed by the swollen streams of the Lena as they make their way to the ocean. Thus the courses of the streams are never the same in two years, and the countless branches bewilder the traveler. It was this that caused Captain De Long and his party to move more and more to the eastward, and become entangled in the wilderness.

When Captain De Long ordered the two seamen, Nindemann and Noros, on the morning of Sunday, October 9, to make a forced march to the southward to Ku Mark Surka for relief, he gave to Nindemann a copy of the chart by which he was working, and pointed out the spot, the island of Tit Ary, where he supposed himself and his party then to be. He encouraged the men by showing that there was only one river to be crossed, and that the village was but twelve miles distant. He hoped they could reach it in three or four days. In reality, Tit Ary itself was near the point where the two seamen fell in with natives a fortnight later, after traveling nearly a hundred and twenty miles, and Ku Mark Surka lay thirty-three miles beyond that. The insufficiency of the chart which Captain De Long had,

the latest accessible at the time of his leaving San Francisco, will be at once apparent by a comparison of it with the chart laid down after the *Lena Delta* had been traversed by the several parties. It is by this fuller chart that one learns for the first time how near was a settlement of natives to the point where the first cutter landed, a fact upon which Captain De Long's chart was silent as the grave, and which was unknown even to the Russian government.

The instructions which Captain De Long gave to Nindemann were not written. He bade him keep on the west bank of the river, since he would not find drift-wood on the east bank, and would not be likely to fall in there with natives. He cautioned him to avoid wading, but rather to walk round water when he could. The two men were lightened of all burdens, were furnished with a rifle, forty rounds of ammunition, and two ounces of alcohol. When they were ready to start at seven o'clock, they shook hands with everybody, the party which remained behind gave them three cheers, and they set forth on their desperate march.

They moved along the bank of the creek to the westward until they could find a place where they could cross. The young ice at the edge could not bear their weight, and they were forced to find pieces of timber with which they could make a rude footway to the stronger ice; upon the other side the ice at the edge broke under them, but the water was shallow. About two hundred yards to the south they came to the larger stream which they were to follow, and found the river open, and the ice running in it. They kept along the bank until about noon, when they saw a ptarmigan upon what appeared like a heavy piece of drift-wood. Nindemann fired and shot his tail-feathers out, but the

bird flew away. The drift-wood turned out to be a kayak turned bottom up. They broke it out of the snow, but found nothing under it, and resumed their journey.

When they halted half an hour later, and gathered some bits of wood for a fire, eight or ten ptarmigans appeared within about fifty yards of them. Nindemann took the rifle and crawled half the distance, when he had three or four in line. He fired and brought down one only, which they cooked as well as they could, and made their dinner off it, but the bird is only about as large as a pigeon and has but little meat on it.

The river ran past a low bluff, and the two men as they made their way along the bank sometimes tried the top of the bank, but were hindered by the deep, soft snow, and sometimes the edge of the river, where the walking was better, except where the bank left no room for passage. About three o'clock they came upon another stream flowing in from the west, and followed its northern bank for a mile, until they could come to a good crossing, when they got upon the other bank and regained the main stream. An hour later they came upon a big flat boat shoved up on the beach, but so broken up that it was unfit for use. It was the grain raft which Captain De Long noted on the 15th. Here they took a short rest and then started on again. A little before dark they saw something to the westward, which, in the uncertain light, they took to be huts. As they came nearer, the objects began to move, and they saw that they were deer. Nindemann went cautiously toward them until he came within a thousand yards; some of the deer were lying down, and some were browsing. He got down upon his hands and knees and crawled within three hundred yards, but the wind was

from his quarter, and they scented him and began to run. He fired three or four shots after them but without effect, and they fled westward, while he stood watching them till they were out of sight.

Back he went to his disappointed companion, and they started again southward, walking until it was quite dark. The wind was blowing, and they camped down on a point of land where a large bay made in to the westward. It was the confluence of several streams,



W. F. C. Nindemann.

and just beyond where, a week later, Captain De Long and his party made their last camp. The two men collected wood for a fire; and making a little Arctic willow tea and soaking and burning a boot-sole, they got what nourishment they could, made bags of their blankets, and crawling near the fire lay down for the night. Now and then, as the cold penetrated, one or the other would rouse himself, lay a little more wood on the fire, and lie down again.

On the morning of Monday, October 10th, they had a little willow tea and another boot-sole, and then started along the bank to the westward, and again to the southwest. They were aiming to keep a southerly course on the west bank of the main stream, but they were in a confused morass, with points of land here and there, which they tried to reach. The wind was high, and the drifting snow filled the air, so that sometimes they could not see fifty yards beyond them. When there was a lull they would get their bearings, but as they went from point to point, they were constantly compelled to cross streams, wading through the water to a sand spit beyond, only to find another stream beyond that. Thus they struggled on all day, from nine o'clock till nearly dark, making a course which was sometimes northwest and sometimes west. The wind was still so high when they halted for the night, that though they found drift-wood, they were unable to light and keep a fire. So, walking till they came to a bank of the river where there was a deep snow-drift, they set to work to scoop out a hole into which they could crawl for shelter. They had no tools but their sheath-knives, and it was midnight before their task was done. Then they crawled in, nearly closed the hole behind them to keep the snow from drifting in, and rolled themselves in their blankets. There they lay the night through, but they were wet to their waists, and had to keep the blood in circulation by knocking their feet together. One would sleep for five minutes, and then be waked by the other and bidden keep from freezing by knocking his feet together.

When morning came it was with difficulty that they could extricate themselves from the hole which they had dug, for the snow had been piled up by the wind against the opening. Once on their feet again, they

found better weather and little of the drifting snow. It was Tuesday, October 11th, and they pushed on southward until midday, when they kindled a fire, meaning to warm a little of the alcohol which they carried; but Noros, who had carried the bottle in his pocket, put his hand in to find that the bottle was broken, and the alcohol gone. They had recourse to the Arctic willow tea and boot-sole, and took up their march again. Toward evening, as they stood on the river bank, they sighted something beyond them which looked like a hut, and after crossing a couple of streams they came up to it, and hailed it as a refuge after that terrible thirty-six hours.

They gathered wood for a fire which they made, and searched the hut, but found nothing save some deer bones, which they threw upon the fire and burned and then made effort to eat along with their willow tea. They dried their wet clothes before the fire, and at length lay down and slept. They were under shelter, and when they looked out the next morning, it was blowing a gale from the southwest, and nothing could be seen but the wild, drifting snow. All day, therefore, they lay in their refuge, seeking again for nourishment from the willow tea and the charred bones.

On the morning of Thursday, the 13th, the weather was clearer, but it was still blowing, and they could get no certain view of where they were going. They were apparently on an island between two streams. The river to the west of them was open to the southward and westward; that to the southward and eastward was open on the south side, with three hills lying there. They kept along the island through the morning, sitting down often to rest, for they were facing the strong wind and it was hard work. It was on this

day that Captain De Long wrote in his journal: "No news from Nindemann. We are in the hands of God, and unless He intervenes¹ are lost. We cannot move against the wind." Nindemann himself was slowly passing the point where he was later to help bury his captain.

In the afternoon they sighted a hut on the west bank of the river. They had seen one in the morning, but had in vain attempted to cross the ice to it. Now they tried to reach this, but were turned back by the brittle ice. They kept it in sight, as they moved southward, and made another attempt to cross the ice, but it broke and they came back. Then they saw that there was no further progress possible to the southward on that side of the water, and they returned to the ice. It broke again, but they kept on. They went in to their waists, but managed to pull themselves up on the stronger ice. The wind was blowing against them, and the ice was a glare, so that they were driven back. They looked about for ice which had been roughened by the ripples beneath, and finding some they succeeded at length in reaching the other side, where were two wooden crosses beneath a bank, which rose fifty feet above them.

They pulled themselves up the bank, but when they came to the hut which they had kept in sight, they found it a ruin nearly full of snow. While Noros was trying to make a place in it for shelter Nindemann saw a black object farther along to the south and went to it. It was a small peaked hut without a door,

¹ By an error this word in some copies of Captain De Long's journal has been made *relents*. Not so did Captain De Long read the Divine mind. To him God was no vindictive, stern tyrant. The records sufficiently witness to his devout, unswerving confidence in a watchful Father.

but large enough to hold the two men. There were some fresh wood shavings outside the hut, and higher up on the hill two boxes. On going to them Nindemann found them old and decayed, and he began to break one of them open. When he had ripped off the top he discovered that there was another box inclosed; breaking into it he found a dead body, and hastily left it. Doubtless the two crosses below on the river bank were memorials of the two beings left high up above the reach of the floods.

Nindemann went back to Noros, and told him what he had seen, and that they would find shelter in the little hut. So they began to gather wood for their fire, and Nindemann came upon five or six pieces of timber lying close together frozen to the ground. He got a stick, pried them loose, and left them for use in the fire, as they were near to the hut, and went off for more drift-wood. Noros, meanwhile coming up, began to move the timbers, when he found that they covered a hole in which lay a box, half filled with the earth which had fallen into it. Upon dragging it out, he discovered in it a couple of fish and one or two fish heads. He made known his prize, and Nindemann coming forward seized upon a lemming, which at that moment came out of his hole. They went to the hut and made a fire. Their supper was some willow tea, the lemming and the fish. They could not dress the lemming, but made a spit of their ramrod and roasted the little animal which they divided between them. The fish were decayed and dropped apart as they handled them, but they found a couple of flat stones and so cooked the fish on these before the fire. Supper over, they closed the opening of the hut with a couple of boards, and lay down by the fire to dry their clothes and sleep till morning.

When morning came it was still blowing hard from the southward, and though they made a start, they found it impossible to make any headway, nor could they see their way through the driving snow, so they turned back to the little hut and stayed there another twenty-four hours, eating what scraps they could gather, and carefully husbanding the little wood which remained to them.

When they looked out Saturday morning, the 15th, the wind was still blowing from the southeast, but the snow had stopped drifting. They made a start along the river bank to the southward and eastward, looking for the main river. They crossed an island and saw signs of natives having been there, and coming upon the river again they struggled over the ice, facing the wind, which was now rising and increasing in strength. About five o'clock in the afternoon they discovered an opening in the river bank, and since the moving was now very hard they thought to make a halt there, but the wind drew through the crack and so they kept on by the bank, hoping for better shelter. They found nothing and had finally to turn back and put up with this fissure. It was a kind of cave extending into the bank, and having another opening at the top. They gathered wood enough to last for the night. One would get into the crack while the other passed in the wood to him.

They found some Arctic willow, but they had nothing to eat, and so Nindemann, who wore a pair of seal-skin pantaloons, cut off a piece, which they soaked in water and then burned to a crust. From this they made out their supper, but though they had a good fire they shivered with the draught which the wind made through the funnel-shaped cave. They tried to

cover the opening with one of their blankets, but it was not long enough. There was not room for both below the fire, so they took turns, one crawling up above and lying upon his face to avoid the smoke, but this was so penetrating that it was impossible for him to stay, and he would shift with his companion. There was little sleep to be had, and little warmth, and they watched for the morning. Possibly it was the smoke from this fire which Captain De Long descried as he lay in his camp to the north.

A little before daylight on Sunday morning, the 16th, the wind moderated, and the snow was drifting less. They were impatient to get away from their miserable shelter, and taking a little more willow tea and seal-skin they started on their march to the southward and eastward in search of the main river, which they believed to flow by the high land which they could see in that direction. They crossed the stream by which they were, and got upon some sand spits where were heavy hummocks of ice. The wind had increased again. They tried to rest in the lee of the hummocks, but the wind was searching and struck through their imperfect clothing, so they struggled on until they reached a large sand bank and saw that the high hills toward which they had been aiming appeared to be about three miles distant. They could see no river, however, and began to fear they must have crossed the main stream. But they resolved to push on to the foot of the hills, and then if they failed to find the river to turn back and take a westward course.

Following the sand spit on which they had halted they soon came to the river. Their orders had been to keep on the west bank, but there seemed to be noth-

ing but sand spits about them, with no chance of game. Moreover they had just seen a crow flying overhead across the river and in among the hills. The crow, in the Arctic regions, keeps among human beings, and this decided Nindemann to cross the river in hopes of reaching some natives on the other side, or some game. They had to move with caution, for there were large open places in the ice. When part way across Noros complained of illness. He had been spitting blood twice. Nindemann, who could move more quickly, bade him follow, while he kept on to the foot of the hills. When he reached the edge of the river there was nothing to be seen. The hills thrust themselves into the river so that they had to take to the ice; and so, sometimes on the shore, sometimes on the river, they kept on their way, but could see no signs either of game or of natives.

At length at dark they came to a ravine in the hills, where they gathered some drift-wood for a fire, and finding no Arctic willow they were driven to taking a little hot water and eating again of the seal-skin. They could discover no shelter, and so they dug a hole in the snow, piled up some blocks of snow to keep off the wind as well as they could, and crawled into their blanket bags. They could not sleep, and would gladly have risen and pushed on, but the night was too dark for them to see their way.

At dawn of Monday, the 17th, they started down the ravine again and followed the river bank to the south, making but slow progress, so rough was the walking. They halted in the middle of the forenoon, made a fire and boiled some water which they took with their seal-skin; they stayed there an hour, trying to mend in a fashion the soles of their boots, which

were badly worn. When they had gone a mile further they abandoned the east bank and recrossed the river. The wind was now blowing and the snow was driving, but for the rest of the day they struggled onward until they came to some hillocks, which appeared to be piles of snow and sand. They tried to dig into them for shelter, but found hard ice below. Again moving on they came to some drift-wood, where they hoped to find a piece large enough to afford some shelter, but in vain. They kept crossing streams and sand spits, and it was midnight before they finally struck a solid river bank. There was drift-wood there for a fire, but the wind was too high to suffer them to light it, and so they had recourse to their expedient of the former night, and dug a hole in the snow, sheltering themselves as best they could by a barrier of snow-blocks.

It was too cold to sleep, and they started again at daybreak, Tuesday, the 18th, along the river bank to the southward. They were now on the west bank of the main stream, but found it easier at times to move on the ice-bed of the river. Now and then they would climb the bank above them to see what lay before them, but the moss and snow there were so deep that they sank to their knees at every step. They halted at ten, when they made a fire, partook of willow tea and seal-skin, but at six o'clock, when they had climbed the bank, they saw a hut about a mile inland. They walked to it and found it a peaked hut, without a door, and almost snowed over. A hundred yards farther on they saw a pile of something which proved to be sleds. There was no drift-wood near by, so they broke up the sleds and used them for fire-wood. They dug out enough snow from the hut to give them sleeping room, and after staying themselves with willow tea and seal-

skin, they lay down for the night. They were weak, but they were within shelter. They had had no real shelter and no sleep since Friday night, and thus from sheer exhaustion and with this slight comfort they slept all night.

When they woke on the morning of Wednesday, the 19th, it was broad daylight. They made themselves



Louis P. Norrs,

some tea, and started southward, weak and stumbling. Till three o'clock in the afternoon they struggled on. They came then to a high cliff, where they saw an owl flying. They watched, hoping the owl would rest and they could bring her down, but she kept flying in a circle, and finally flew over the cliff beyond their hope. They were so exhausted now that they could scarcely move for more than five minutes at a time. They began to regret the hut they had left behind them. There at least they would have had shelter. About

four o'clock, as they stumbled on, they came to a small river running across their line of travel. They reached the other bank when Noros looking back discovered three huts on the bank they had left. It was the place set down on later maps as Bulcour. They recrossed the stream, and on making their way to the huts found in one of them a kayak with some fish-nets and other articles. Near by was a half kayak with something in it. Noros tasted it. It was like sawdust. Nindemann also tasted it. It was blue molded and tasteless to them, but it was fish, and they took it with them to the other huts. They found nothing more, and after gathering some drift-wood they made a fire and tried to find some food in the moldy fish.

They slept by the fire they had made, and Thursday they gathered a little wood. They knew how weak they were when they were gathering it, though when they sat by the fire they thought themselves strong enough to move on. But they stayed by the hut all day. Dysentery had attacked them and their strength seemed failing.

When Friday, the 21st, came, they thought they would make a start, but were so weak that they put off the attempt till the morrow, and spent the day in a careful husbanding of their resources. They measured in their tin cups the fish that was left, and found that by taking each two cupfuls a day they had enough for ten days. Nothing else remained to them but a skull-cap apiece, and a pair of foot-nips. These they proceeded to fill with fish and sew up, and then rigged them with straps for carrying.

On the morning of Saturday, the 22d, Nindemann was ready to make a fresh start, but Noros said, "We are pretty weak yet, and as the weather is cold we had

better rest another day ;” and Nindemann, in his narrative adds, “By this time our dysentery was so bad that it was almost impossible for us to start, and I think that if we had started, we should have frozen by the way.” So they kept in the hut and worked at their boots, which were falling to pieces.

At noon, as they were seated by the fire, trying to get a meal ready, they heard a noise outside like a flock of geese sweeping by. Nindemann looked through the crack of the door, and saw something moving which he took to be a reindeer. He took the rifle down, loaded it, and was moving forward, when the door opened, and a man stood at the entrance. Seeing Nindemann advancing toward him with his rifle, he fell on his knees, throwing up his hands, and began to supplicate him. Nindemann threw the rifle into the corner and beckoned eagerly to the man to come in. At first the man was fearful, but finally came in, and the two men, wishing to show that they were friends, offered him some of the fish they were cooking. The man shook his head and made signs that it was not fit to eat. He had come in a sleigh with reindeer, and the men went out to see what he had. He had nothing in his sleigh to eat, but Nindemann picked up a large deer-skin coat and brought it with him into the hut, and by signs offered to give the man in exchange his flannel shirt, but he shook his head. Nindemann showed him his boots, and the man went out to his sleigh and brought back a pair of deer-skin boots.

The two men now tried their best by signs, but in vain, to make the man understand the critical condition of the captain and their shipmates ; he only made signs in return that he must go and that he needed his coat, for it was very cold. He brought in a deer-skin,

however, which he gave them, and then held up three or four fingers to tell them apparently that in three or four hours or three or four days, they knew not which, he would return. He took the shirt which Nindemann had offered him, drove off along the river to the westward, and was soon out of sight.

Nindemann and Noros looked at each other, when he had disappeared, and began to question if they had done wisely in letting him go off. Nindemann feared he had scared him with his rifle, and that he would not come back, but Noros was confident that he was a good Christian and would return. Nindemann finally said that they would wait four days for his return, and then, if he did not appear, they would keep on to the southward. They were too weak to think of a march now. They were too weak indeed to go down the river bank after drift-wood, and so they collected the sleds which they found, the berths in the huts, and any loose wood, and dragged these to their fire.

About six o'clock in the evening, as they were boiling some of their moldy fish, they heard a noise without, the door opened, and their visitor, with two other men, came into the hut. After a vain attempt at making each other understand anything, one of the men went out, brought in a frozen fish which he skinned and sliced; while the sailors were eating it — the first real food which they had touched for many a day — the natives made signs for them to go with them. They brought in some deer-skin coats and boots for them, gathered what was in the hut, and then putting the men into reindeer sleighs drove off with them along the river to the westward. The way led into the mountains, and they kept on their drive for about fifteen miles, when they came to a ravine where were

a couple of deer-skin tents, and fires could be seen burning.

The natives took Nindemann into one tent and Noros into the other, and gave them some boiled venison. There were seven men and three women in the party. One of the women seeing the forlorn condition in which Nindemann was offered him water to wash. He washed his hands, but they were so bent and sharp that they were more like claws than hands, and he found himself unable to wash his face, so that the woman took pity on him and washed it for him. The people gave the sailors more venison and fish, and they in their turn tried to tell their story and their errand. At first the people seemed to attend, but presently they were curious to know what the sailors had about them, and if they had any money. Nindemann tried to make them understand that they had plenty of money in the ship, that the ship had gone down, but that if the men would help them, they should have plenty. It was impossible to say how far they were understood.

It was late in the night before the people in the tents disposed themselves for sleep, and in the morning when Nindemann awoke it was daylight, and breakfast was prepared. Again he tried to make them understand his wishes, but in vain; and after breakfast, while the rest were out catching the reindeer, he found the man who seemed to be the head of the party, and drew in the snow a chart of the places where he had been, making signs all the time, sometimes thinking he was understood and then in despair. There were over a hundred head of deer which the natives harnessed to twenty-seven sleighs loaded with reindeer meat, reindeer skins, and fish, and when all was ready, they broke camp, and drove over the mountains to the southward.

At noon when they stopped to rest the deer, the man with whom Nindemann had talked led him to a point from which they could descry a prominent landmark in the Lena Delta, which he and Noros had had in sight a long while on their march. The man asked by signs if that was where they had left their people. Nindemann explained as well as he could that Captain De Long and his party were fifteen or twenty miles probably to the northward of the point. He watched the man anxiously to see what he would do, but he only shook his head as if sorry, and went back with Nindemann to the sleighs. They kept on their journey to the south, camping again at night.

Another day was spent in the same way. Occasionally when climbing a hillside, all the people would get out to lighten the load, but Nindemann and Noros were still so weak that they lagged far behind the rest, who were obliged to wait for them. About five o'clock they came to a collection of huts, the Ku Mark Surka, which had been the point which Captain De Long had hoped they would make in three or four days. Here were a number of natives looking out for the return of the party, and the two sailors were the object of great curiosity. The people crowded about them, talked to them, talked about them, and Nindemann in vain tried to make himself understood. The huts were full of people feasting, and it was soon difficult to get their attention.

“On the morning of the 25th,” says Nindemann, “after breakfast, I started again talking to the people through signs and pantomime; it seemed as if one of them had got some idea of where we came from, or what we wanted, and he talked to one of the boys, and the boy went out, and after awhile came back with a model of a Yakutsk boat, and then they all got round

me and wanted to know, as near as I could make out, whether our ship was something like it. I then went to work and got some sticks and placed them in the boat, showing them that our ship had three masts, and then got more sticks, showing them that she had yards. This seemed to surprise them very much. I then made a smoke-stack out of wood, and pointed to the fire and smoke, and then showed them the place astern where the rudder was, and had a small roll which I turned to make them understand that our ship was a steamer. I then made models of the boats, and showed them how many boats the ship had. Then I told one of the men to get me a couple of pieces of ice. He went out and got me a couple of pieces of ice, and I showed them how the ice had crushed our ship. I then pointed to the northward, as much as to say, the ice crushed our ship away to the northward, and that we saved three boats, putting in each little boat so many sticks, to represent how many men there were in each boat. At the time there was a dog in the room. A man pointed to the dog and wanted to know whether we had any dogs. I counted on my fingers that we had about forty, and made them understand that we had shot the most of them, and left some of them behind on the ice. I then showed them a chart of the ocean and the coast line, showing that we had a gale of wind, and that our boat went in here, and that we did not know what had become of the other two. I then showed them on the chart where we had landed, and made the boat on the chart a little way off land, and then I showed them by pencil-marks that everybody had left the boat and waded ashore. Then showed them the way we walked along the river bank, and I marked the huts where we stopped. Here we came to the place where Ericksen

had died. I showed them through signs that he had died, and that we buried him in the river. Everybody shook his head, as much as to say they felt sorry for it. I then made them understand that we had left the captain a couple of days after that, and by putting my head down and closing my eyes, to show them how many days it had been that we had left him. This seemed to affect them pretty well, but it seemed to me as if they would not give me any assistance. Sometimes it seemed to me as if they understood everything that I wanted. Then all at once it seemed that they did not understand a word. I kept talking with those people till it must have been somewhere near twelve o'clock, but they did not show any signs by this time of any intention to give me assistance, or to do anything for me."

Another day was spent in an incessant but fruitless attempt to make themselves understood, and on Thursday morning, October 27th, Nindemann sitting alone on his berth and thinking of everything, of their terrible march, of their helpless companions, and of the hopelessness of carrying any aid to them, could contain himself no longer, and broke into sobs and groans. A woman in the hut took pity on him, and began talking earnestly to one of the men, who came to Nindemann and said something about a commandant. By this time Nindemann had picked up a few words, and he begged the man to take them on to Bulun, for he was in despair of doing anything in this place. The man in reply again said something about the commandant, and held up five or six fingers. Then he made Nindemann understand that he would take him to Bulun on the morrow.

The day passed by, and late in the evening a native

came in and told Nindemann that the commandant was coming. He was followed at once by a tall Russian whom Nindemann took to be the commandant, and eagerly accosted in English. The Russian, an exile by the name of Kusmah, could not understand him; but he evidently knew something of affairs, for he uttered two words, *Jeannette*, *Americansk*. Nindemann suddenly thought he might be some Russian officer who had had orders from his government to look out for them. He tried him in German, but the Russian shook his head. He took out the little chart which the captain had given him, and pointed out the places, but the Russian seemed to have no conception of what the chart was. Then the Russian said something, but all that Nindemann could catch was, "St. Petersburg," and "telegrams." If it was necessary to wait for a dispatch to St. Petersburg, Nindemann thought in despair, all was over, for it would be impossible to reach the captain in time.

While this confused exchange of words was going on, Noros was in the hut writing out a note which the two men had composed, and the Russian picked up the paper and put it in his pocket. They asked him for it, but he refused to give it back, and about midnight took his leave. He came back in the morning and gave them to understand that he was going to Bulun, and that they were to follow shortly. The people with whom they were had furnished them with deer-skin clothing and boots, and when preparations were made to send them on their way, the woman of the hut where Nindemann had stayed gave him some smoked fish to eat on the road.

The two sailors were now in charge of a man with reindeer who was to take them to Bulun. They spent

one night in a hut on the road with natives, and after twice crossing the river, continued to the southward, and reached Bulun about six o'clock in the evening of October 29th. Here they were housed and given some tea, and then a native came and signed to them to follow him to the commandant. They expected to see the Russian with whom they had held their interview at Ku Mark Surka, but found another man in his place, who said that he was the commandant. Nindemann shook his head and otherwise expressed his doubt, whereupon the commandant, to convince him, showed him his uniform and sword. Nindemann now attacked this man also with signs and pantomimes to explain the state of affairs. He counted off on his fingers the number of people whom he had left to the northward, the captain and ten others. The commandant nodded assent, and seemed to understand, and Nindemann went on explaining. This man also spoke of telegraphing, and Nindemann, making signs for pen, ink, and paper, dictated to Noros a dispatch to the American minister at St. Petersburg.

The commandant said that he would take the paper on the morrow to the "captain," by which the men understood him to mean that he would take it to his superior officer at the telegraph station, but they did not know what telegraph station there might be in the neighborhood. They stayed that night with the commandant, and the next morning, and toward noon the commandant packed a box, and repeated that he was going off with the dispatch to the captain. The assistant-priest of the village had come in, and when the commandant left, invited Nindemann and Noros to his house. He kept them to dinner, but could not have them stay with him, as he was about to be married,

Bulun to find them. They told their story, and showed how they were now famishing upon the meagre fish diet, which was all they could get. Mr. Melville, who could make himself understood in Russian, sent for the priest, and demanded that the two sailors should have the best which the place afforded. To them, however, the best was that they were once more in the hands of their countrymen, and under the direction of their old officer.



Native huts and fish houses, Lena Delta.

CHAPTER XX.

THE FORTUNES OF THE WHALEBOAT PARTY.

12 *September* — 2 *November*, 1881.

The Separation in the Gale. — Heaving to. — The Storm. — Standing in toward the Coast. — The Mouth of a Broad River. — A Landing. — Up the River. — Discovery of Natives. — Cape Borkhia. — Piloted by the Starosti. — Arrhu. — Geeomovialocke. — Attempts to reach Bulun. — Condition of the Men. — Dispatches. — Kusmah. — Kusmah sets out for Bulun. — Lieutenant Danenhower attempts to reach Barkin. — Anxiety at Kusmah's Delay. — Return of Kusmah. — Intelligence of Nindemann and Noros. — Mr. Melville sets out for Bulun.

WHEN the three boats separated in the gale of September 12th off the Siberian coast, Lieutenant Chipp was in command of the second cutter, and the three boats were under close-reefed sail, driving before a northeast gale. Chief-Engineer Melville was in command of the whaleboat, Lieutenant Danenhower, on the sick list, was with him, and R. L. Newcomb, the naturalist. The seamen Cole, Leach, Wilson, the firemen Bartlett and Lauterbach, the Chinese steward and the Indian Aneguin completed the number.

At seven in the evening the whaleboat was a little ahead of, and on the weather bow of the first cutter, about five hundred yards distant, when Captain De Long made a signal to Mr. Melville. In order to bring the whaleboat nearer Mr. Melville partially lowered his sail and gathered in the foot of it, hoping to drift toward the first cutter, but in slackening the speed the

seas began to come over the stern, and though the men pumped and bailed, there was great danger of being swamped.

Captain De Long perceived the situation and waved his arm to Mr. Melville with a motion which the latter interpreted as bidding him run before the wind and take care of himself, so he hoisted his sail, and in order to keep ahead of the sea, shook out one reef and hauled the boat about one or two points toward the southward. At the same time he saw Captain De Long make a signal to Lieutenant Chipp in the second cutter, which was about seven hundred yards distant from the first cutter and on her weather quarter. Shortly after, the whaleboat being a fast sailer, and darkness coming on, Mr. Melville lost all sight of the other two boats, and navigated the whaleboat without regard to them. He was uncertain how long he might be at the mercy of the elements, and accordingly reduced the allowance of pemmican from one and a half pounds to three quarters of a pound for each person, a day. The snow which they had brought from the island for quenching their thirst was rendered useless by the deluge of salt water which dissolved it.

The sea was running so high that it became necessary to heave the boat to, and a drag was made of three tent poles and a piece of canvas, giving about six square feet of surface. In this manner they rode out the gale from nine o'clock of the evening of September 12th to five o'clock the next afternoon. Before leaving Semenovski Island a weather-cloth had been contrived from the canvas boat-cover. It had been cut from the stern nearly as far as the mast, and tacked around the rail; the canvas had been peaked up by means of a mast coat, so as to shed the water off the

bows; a piece of canvas also had been sewed across to make a thwart-ship bulkhead; the canvas was tacked along the sides and raised on wooden stanchions; it was supported by the shoulders and backs of the men, thus making a cockpit and half-decked boat. The men crouched down to avoid the force of the gale and were constantly at work bailing the boat.

The storm was still raging when daylight broke on the morning of the 13th, and though the sun showed itself a little after noon, it was not until five in the afternoon that the storm had so far abated as to make it safe to get under way again. The wind and the sea had then subsided somewhat, and all night they ran to the west and southwest.

On the morning of the 14th the boat grounded in two feet of water, with no land in sight, and they stood to the eastward, hoping to get off the shoal and to feel their way southward; the point which they aimed to make, in accordance with the instruction of Captain De Long, was Barkin. There were light airs from the south southeast all day, but toward evening the weather looked more threatening, and, fearing to be caught in the shoals in bad weather, they stood to the eastward, and at midnight were in ten fathoms of water. Then the course was laid southeast, and at six o'clock on the morning of the 15th they stood to the southwest, hoping to strike the north and south coast of the Delta.

It was not until the morning of the 16th that they raised land, two low headlands forming the mouth of a large river. The water was muddy and brackish, but as the men had had no water to drink for four days they eagerly partook of this; as they slowly ascended the river the water became sweeter. The river mouth was a very wide one, the headlands being barely discern-

ible, and the water was discharged with considerable force. The wind, however, was from the eastward, and they worked on up the river, grounding occasionally on the shoals, for the channel was very tortuous. They tried to effect a landing but found it impossible, since the channel did not pass near the land, and the shoals constantly interrupted the boat's course. It was quite clear that they were to the south of Barkin, which point they had been ordered to make, but it seemed unwise to put out again to sea with all the chances of encountering another gale in their crippled condition, and they kept on up the river.

About seven o'clock in the evening they sighted a hut on a bank about ten feet above the water, and succeeded in making a landing near it. They hauled the boat up, got their gear out, and built a fire in the hut, which showed signs of having recently been occupied. When they got out of the boat, they were, for the most part, scarcely able to walk, so swollen and cramped were their legs and feet. They had been in the icy waters of the river, and the exposure had intensified the frostiness in their limbs, so that the fire at night caused terrible pain; nobody slept, and in the morning they were in a worse condition apparently than they were the previous night.

After shoving off in the morning and working up the river all day long they made an excellent day's work, finally coming to a branch of the river running nearly north and south. This they took to be the Lena proper, and after turning to the southward they camped on a low point of land in the mud. They called this the "Mud Camp." Three persons slept in a hut on the high ground.

On the 19th they took to the boat again, and, after

following the river, came into what appeared to be a large bay. The channel was very tortuous, sand spits were continually interrupting their course, but at length, shortly after noon, they effected a landing near a collection of huts. They had taken their dinner and were pulling off to get nearer the huts, when they espied three natives approaching them in their canoes. They beckoned to the natives to come close, and, after some hesitation, one of the canoes came alongside the whaleboat, when it was seized by one of the sailors. A little alarm followed, but by various signs Mr. Melville made the natives understand that they were friendly, and followed them to their landing-place. Here they feasted upon venison and goose and fish, and by an interchange of civilities soon became on excellent terms with the three natives. Mr. Melville tried by pantomime and drawing to persuade the natives to pilot them to Bulun, and the natives in turn, making out his wish, used very expressive pantomime to reply that it would be sure death to them to attempt it.

The place proved to be Cape Borkhia, and was a fishing camp of the natives. They stayed there all night and tried again, but in vain, to induce one of the natives to conduct them to Bulun. Then they pushed off again, but after a day and night of great discomfort on the river, a gale coming on, they were forced to return to the huts they had left, and reached Cape Borkhia in the evening. They found then that the Starosti, or head man of the village, had been sent for, and, on his arrival, Mr. Melville succeeded in persuading him to pilot the party to Bulun, which they made out from him to be six days distant.

They started on their journey the next day, September 22d, and on the 25th had reached a collection of

huts called Arrhu, where were about a dozen men, women, and children. Here the Starosti of Borkhia gave out, and secured the services of three young men of Arrhu to take them to the next point, the village of Geeomovialocke, where they arrived on the evening of the 26th. The condition of the men in the whale-boat at this time was very trying. They were badly frozen and otherwise incapacitated; but two or three, or at the most four, were able to do any work, but the men and women of the village helped discharge the boat, and the Starosti gave them the use of his house. The village was the first place which could be so called, which they had reached. It was upon an island in the river, and the natives assured Mr. Melville that it was a journey of sixteen days to Bulun. He insisted upon being taken there, and as his supply of provisions was now exhausted, he was compelled to depend upon the stores of the natives and upon such small game as they might fall in with.

They made an attempt to get away the next day, the purpose of the natives being to skirt Cape Borkhia and Cape Ordono, and to make their way into the Lena River proper upon which Bulun was situated; but after struggling with the ice and beating against a rising wind, they were compelled to return to the village and haul the boat up. The ice began to close in about the island, and the natives assured them that there was no way of escape until the wind should blow the ice out of the bay, or until the bay should be so completely frozen over as to permit them to cross it on the ice.

They were given a single hut, and furnished with provisions by the natives, but the addition of the party to the village at a time when it was very difficult to increase the stock of provisions made the situa-

tion a serious one, and the villagers put the strangers upon an allowance. Moreover, the diet to which they were forced, and the lack of any anti-scorbutic, might lead to an outbreak of scurvy, as the party was in a most crippled condition. "At this time," says Mr. Melville, "an exile had been put to live with us, making twelve men in our hut. We had had no bread for about forty days; we had no anti-scorbutics of any kind, no salt to use with our food, and the geese which we were supplied with were in a very bad state of decay, so much so that when we would hang them up their intestines would drop out. I told the men that they must be as cheerful as they could; make a point of burning plenty of wood; keep themselves as warm as they could; any way get plenty of wood so as to exercise all hands. I was very anxious at this time, owing to our short supply of provisions, and the kind we were living on, fearing that the decayed geese would cause typhoid fever, from the fact that we had no anti-scorbutics; in case we stayed there, I felt there was great probability of the whole party dying of scurvy."

They had amongst them prepared documents for transmission to the nearest authority. Mr. Melville prepared a telegram to the Secretary of the Navy and to the American Minister at St. Petersburg; letters were also written in English, French, German, and Swedish; pictures of the ship in the ice, and of the American flag, and some postage stamps were added, and all the papers sewed in an oilskin bag and committed to the Starosti of the village, who undertook to send them forward.

One by one the men began to improve in their condition, and Mr. Melville was exceedingly anxious to get the party moved to Bulun, and about the 10th of Oc-

tober there came to the village a Russian exile, who seemed more intelligent than the men about them, and was living across the bay on the mainland. This man was the Kusmah who later fell in with Nindemann and Noros. He represented that the ice in the bay was in such a condition that it would be impracticable for them to cross at this time, but promised on leaving to return in a few days and then go to Bulun for them and secure the assistance of the commandant of that post.

Kusmah was as good as his word, and on October 14th came again to Mr. Melville and expressed his readiness to go to Bulun, and to bring reindeer teams for the transportation of the party, as well as food and clothing, of all of which they stood very much in need. He told Mr. Melville that he would go and return in five days, and Mr. Melville promised to pay him, if he fulfilled his contract, the sum of five hundred roubles, and give him the whaleboat. He required also that he should start at once. He did not go, however, until the 16th, for it appeared afterward that as a criminal exile he could not go without the company of the Starosti of the village. However, he went at last, and they all impatiently awaited his return.

Meanwhile, in their intercourse with the Russians and the natives, they were slowly acquiring greater facilities of speech, and they learned that Barkin was only forty or fifty versts, or twenty-seven to thirty-four miles to the northeast of where they then were, and Lieutenant Danenhower made an attempt to reach the place in order to learn something, if possible, of the other boats. Owing, however, to the faithlessness or lack of intelligence of the natives, and to the difficulty of travel, whether by land or by water, he was

obliged to return to Geeomovialocke without accomplishing his errand.

As the five days of Kusmah's proposed absence were lengthened to as many more, Mr. Melville began to grow exceedingly anxious, and to cast about for means of getting away without waiting for Kusmah. He proposed to take sleds, load them with provisions, and while some of the party, who could, walked, to carry the remainder on the sleds. The great difficulty which presented itself was the necessity for a guide, and they were also insufficiently provided with clothing for a journey which promised great exposure. No guide could be had, for there appeared to be no one, save Kusmah and the Starosti, who were competent to pilot them.

At length on the evening of October 29th Kusmah returned, bringing with him some supplies, letters from the commandant and priest at Bulun, and the short note from Nindemann and Noros, which Kusmah had pocketed when he met these men at Ku Mark Surka. It may here be remarked that the sailors when talking by signs with Kusmah had been perplexed by the alternate intelligence and ignorance of the Russian. They did not know that Kusmah had come from Mr. Melville, and Kusmah in talking with them, if talking it could be called, had the whaleboat party in his mind, when Nindemann and Noros had Captain De Long and his party in their minds.

Kusmah explained to Mr. Melville that his prolonged absence had been caused by unexpected difficulties in the journey, and that the commandant was to leave Bulun at once with the necessary teams and supplies. But Mr. Melville, as soon as he had received this intelligence of the whereabouts of Nindemann and Noros,

and that the captain and his party were in need of assistance, lost no time in starting for Bulun. He left his party in charge of Lieutenant Danenhower with instructions to proceed to Bulun as soon as transportation could be had, and started by dog-team, in company with a native, to go on in advance, hoping to meet the commandant on the road. They passed each other without knowing it, and Mr. Melville reached Bulun the evening of November 2d, where he found Nindemann and Noros as already related.



Siberian Exile Huts.

CHAPTER XXI.

THE FIRST SEARCH.

3 — 27 *November*, 1881.

Bartlett arrives at Bulun with Dispatches from Geomovialocke. — Mr. Melville goes North to Buralak. — Meets the Whaleboat Party. — Sends them South to Bulun and Yakutsk. — Proceeds in the Track of Nindemann and Noros. — At Bulcour. — The Two Crosses. — Mat Vai. — Kas Karta. — North Bulun. — Is shown Records left by Captain De Long. — To Balloch. — Finds the Cache made when the First Cutter Landed. — Secures the Deposit. — Returns to North Bulun. — To Osoktok. — To Sister Ganach. — Loses the Trail. — His Perilous Condition. — Sets out to return to Bulun. — A Severe Journey. — Rejoins the Party at Bulun. — Proceeds with them to Yakutsk. — Remains at Yakutsk with Nindemann and Bartlett. — Lieutenant Danenhower proceeds to Irkutsk. — Details of Men to assist in Spring Search. — Lieutenant Danenhower returns to America.

THE commandant of Bulun, when he went to Geomovialocke, carried with him the long dispatch which Nindemann and Noros had prepared for the American Minister at St. Petersburg, and delivered it into the hands of Lieutenant Danenhower, who at once determined to send it by J. H. Bartlett, fireman, to Mr. Melville, and to follow with the rest of the party as soon as he could persuade or drive the commandant into starting. The next evening, therefore, after Mr. Melville had arrived at Bulun, he was met by Bartlett, bringing the dispatch, and also a letter from the commandant to the Starosti of Bulun, instructing him to

furnish Mr. Melville with a deer-team down the river to Burulak, which lay on the road between Bulun and Geeomovialocke, and advising that he was on the way with the whaleboat party.

Accordingly, when Mr. Melville reached Burulak on the evening of November 4th, he waited until the next day, when the whole party appeared under charge of the commandant. Mr. Melville now held a consultation with Lieutenant Danenhower, and announced his intention of proceeding at once to the north with natives in search of Captain De Long. He gave Lieutenant Danenhower instructions to proceed with his party to Bulun, there to add Nindemann and Noros, who were in no condition at the time to join in any search, but to leave Bartlett at Bulun for further service. He was then to conduct the whole party under his charge to Yakutsk, where he would be in communication with the Russian government and with the United States Minister. There he was also to await the arrival of Mr. Melville, who expected to be absent a month possibly in his search.

Lieutenant Danenhower parted with Mr. Melville, and at Bulun, finding there was not sufficient transportation for the whole party, decided to leave the most able-bodied under charge of Bartlett, and to proceed south with the weakest and most disabled, leaving the others to act as support to Mr. Melville, and to return finally with him. He started from Bulun November 12th with Mr. Newcomb, Cole, Leach, Wilson, and the Chinese steward; leaving behind him Bartlett, Nindemann, Noros, Lauterbach, Manson, and Aneguin. Nindemann was by no means able-bodied at the time, but he preferred to remain in order to regain his strength, and it was possible that with the knowledge of the country and people which he had acquired, he might be of

further use to Mr. Melville in his search. The party with Mr. Danenhower reached Yakutsk, a distance of about twelve hundred and fifty miles, December 17th.

When Mr. Melville started north from Bulun in search of Captain De Long, he had made careful notes of all the information which Nindemann and Noros could give him. His intention was to return upon their course as closely as the somewhat indefinite chart would allow, and to continue as far as the point where Captain De Long had landed. He was furnished with two dog teams, two native drivers, and ten days' supplies of fish for the men and dogs; and immediately after conference with Lieutenant Danenhower at Burulak, he set forth, and before night reached Ku Mark Surka. The next day he came to Bulcour, the huts where Nindemann and Noros had been found by the natives, but was obliged to lie by there a day on account of a severe storm which made further progress perilous. Mr. Melville had not yet recovered from the effect of the exposure at landing when his feet were frozen, and had again frozen his feet on the journey from Bulun to Burulak. He remained, therefore, with his native party at Bulcour until the morning of November 8th, when the storm had cleared, and then proceeded on his way.

His course took him, point by point, over the track of the two sailors. On the 8th he found the place where they had burned the sleds for fuel, and pushed on thence, making about forty miles that day, and camping at night in the snow. On the 9th he found the place known as the Two Crosses, where Nindemann and Noros had slept after their long wandering upon the river, and that night he camped at Mat Vai, the name given by the natives to the hut where the sailors

had spent the night of October 11th, and the whole of October 12th. Nindemann, in reporting his journey to Mr. Melville, had forgotten to name this place, and accordingly Mr. Melville thought for a time that he had come upon evidences of occupation by some of Captain De Long's party; for the sticks used to protect sleepers from the ground had been rearranged so as to make a bed with the feet toward the fire, a custom different from what prevailed among the natives of this region. One of the party also picked up a waist-belt, and Mr. Melville, on examining the buckle, knew that it had been made in the fire-room of the Jeannette.

With this perplexing evidence of occupation, he made up his mind to keep on, following the west bank; but upon ordering the natives to make ready to move the next morning, November 10th, they met him with the statement that provisions were exhausted, and they must return, for there was nothing either for them or their dogs. As the commandant had agreed to load the sleds with ten days' provisions for men and dogs, and they had only been out five days, Mr. Melville insisted upon going on. He asked how far it was to the nearest village, and they replied that it was more than a hundred miles, but they did not want to go on; they wanted to go back. There were twenty-two dogs with them, and Mr. Melville very emphatically told them that he should go on; that they would eat the dogs as long as they lasted, and when the dogs gave out he should eat them.

His resolution had its effect, and they set out for the village, which was called North Bulun and close to the shores of the Arctic Ocean. They passed a number of huts upon the way and spent one night at a place called Kas Karta, where the abundance of scraps of



reindeer meat showed very clearly that none of Captain De Long's party had come this way. The journey was one of extreme severity, and when they reached North Bulun, at midnight of the 11th, Mr. Melville was so badly frozen that he had to be carried from the sled to a hut. Here the natives began to swarm about him, and now for the first time he began to collect evidence of the party. One man brought him a paper, which proved to be one of the records left by Captain De Long on his march, and told him there were other papers and a gun to be had. These were produced the next day, which was a very stormy one.

Upon examining the natives Mr. Melville was able to locate the direction and distance of the huts where the records had been found, and he at once made preparations to push his search. His team of dogs was worn out, and he secured a fresh team, and directed ten days' provisions to be packed on the sleds. The natives were reluctant to obey his instructions, and when he had entered the hut again to make ready for his journey, they managed to unload a portion and return it to their storehouse. Mr. Melville's feet were in such a condition that he could not wear moccasins, and the women in the hut provided him with deerskin mufflers for his feet. He set off, however, on the 13th, to make Balloch, the hut where the first record had been found, and distant from North Bulun about thirty-three miles.

He reached the place in the evening and slept there that night, but found no further record or evidence of occupation. This was the place where Captain De Long and his party had slept the night of September 21st. By reference to the chart which he had, it will be seen that no such place as North Bulun was marked

upon it, and he could have no knowledge that there were natives thirty miles or so to the westward. Mr. Melville, on the morning of the 14th, turned his dogs to the north and followed the east bank of the river until he came to the Arctic Ocean. Then he kept along the shore to the eastward until he came up with the flagstaff which marked the place where the articles of the boat had been cached. Upon digging he found the log books, the chronometer, the navigation box, a lot of pots and pans and kettles, two fire pots, a number of old sleeping-bags and old clothing which had been used to cover the instruments. He loaded his sled with everything, carrying away much that was worthless, in order to avoid misleading any one who might go there afterward on a similar search.

He returned that night to Balloch, and the next day he proposed going to Osoktok, the second hut at which records had been found. It lay twenty-five miles or so to the southward, but there were no provisions either at Balloch or Osoktok, and he was compelled to return to North Bulun to make a fresh start. There he selected from the material which he had brought away from the cache whatever was of value, and gave the rest to the natives. He procured two good teams of dogs and a short team of seven dogs, and set out again on the 17th, as soon as a raging storm would permit him, for Osoktok. He found nothing there, and pushed on to the next hut where Captain De Long and his party had stopped and left a record. In this record Captain De Long had expressed his intention of crossing the river to the westward, and following down the west bank to a settlement. Mr. Melville, therefore, after spending the night at a more habitable hut not far away, took the same course the next day. He

could distinguish the groove which the sled had cut in the soft slush a month before. In that wilderness nothing had passed since to cover the track.

Mr. Melville was in search now of the hut where Ericksen had died. He was guided only by Nindemann's account, and it was of course a matter of extreme difficulty to determine a locality which was marked clearly enough in the sailor's mind by the death of his comrade, but had been only one of the various stopping places in a fearful march through snow and over ice. As nearly as Mr. Melville could conjecture, this hut was anywhere from fifteen to twenty-five miles to the south of where the party had rested after crossing the river, and the natives who were with him guided him to a hut answering to that distance on the west bank. It was not the place, however, for which he was looking. They said there was another on the east bank, a few miles farther south. He went there also, but it was not the place, for Nindemann had told him of the epitaph board which they had placed over the door of the hut.

He kept on to a hut called Sister Ganach, and there spent the night. It was storming furiously. The snow was very deep, and it was with difficulty that he could persuade the natives to go on, but at length they succeeded in moving forward to a hut known as Qu Vina. In both of these huts there was so much in the way of remnants of reindeer meat that it seemed very clear that Captain De Long and his party could not have passed this way. It was Saturday evening, the 19th of November, that Mr. Melville reached this point, and here he was forced to stay through the storm until Monday, the 21st, when the weather was comparatively fine. From this time until he rejoined his people at Bulun we will give the narrative in his own words:—

“I started at three or four o'clock in the morning to follow the river bank down as far as the hut Mat Vai. This is where I was doubling on my own track. It was now thirty or thirty-two days after the time that Nindemann and Noros had left them there poorly clad, and I had made up my mind by this time that after thirty days' starvation they were all probably starved or frozen to death; that in the mean time if they had found the natives, or if the natives had found them, they were as safe as our party were; but if they had not found the natives they would surely be dead. I then made up my mind to make as quick time as I could by way of the hut Mat Vai back to Bulun. Now that the weather was fine, I intended to run by the hut, as it was but forty versts (twenty-six miles)-even if it stormed. I concluded to stop at Mat Vai as short a time as possible, as we were out of provisions except the offal that I had picked up in the huts. After leaving Qu Vina about two hours the natives stopped their teams and dug up a cache of venison bones that they had buried the summer before. They added this to our load, and we sledged along, passing Mat Vai in the afternoon.

“About seven o'clock in the evening, in entering a mountain gorge where the river debouched into the bay, the storm blew from the southward, so that we were compelled to camp down. It is impossible to move when it storms and blows, because the dogs cannot be made to face the wind. They simply lie down and howl; and beat them as you may you cannot make them move. The natives dug a hole in the snow about six feet square, three or four feet deep, turned the sleds up to the windward of the hole, and got into their sleeping bags in the snow bank. The storm continued

to blow during the whole of that night, the next day, and the next night. It was impossible to move until the next day morning, when it cleared up a little, but, in the mean time, we had nothing to eat. It was too stormy to make a fire to make tea, and the venison bones which the natives had dug out were full of maggots. We chopped this up in little cubes and swallowed it whole, which made me so sick after it warmed up in my stomach that I vomited it all out again.

“About seven o'clock in the morning I got ready to start the teams to the southward, turning the short team back again to go home. The short team of dogs had something like two hundred and fifty versts (about a hundred and seventy miles) to go northwest, and no supplies but two dried fish and a quarter of a pound of tea. I put all the loads from the three sleds on to two sleds, and started for Bulcour, the nearest place where I could make a fire. I arrived at Bulcour about eleven or twelve o'clock at night. It stormed so during this day, the wind had carried dogs and sleds whither it would. Owing to the manner in which the sleds were made, in traveling over the sand banks the runners were worn away, so that the lashings were constantly cut and the sleds were continually breaking down. I set to work repairing the sleds, and the next day started for the native village known as Ku Mark Surka, about fifty or fifty-five versts (thirty-three to thirty-six miles) from Bulcour. On my journey to the northward, I had traversed this fifty versts in about seven hours, but on my return it was so stormy and the snow so deep that it took about fourteen hours. The dogs were so exhausted from starvation that they could only drag the sleds along. I was frozen so badly that I could not walk. The natives were not frozen, but were so tired

from hauling the sleds, that when they got within eight versts (five and a half miles) of the village, they proposed not to go any farther, but wait until the next day and camp in the snow. When the natives stopped, the dogs howled like wolves, the dogs in the village hearing the dogs attached to the sleds howling, answered the call, and the dogs made a fresh start and got in all right that night out of the storm.

“I arrived at Ku Mark Surka on the 24th of November, remained there all night, and the next morning started the dog teams and arrived at Burulak, where I remained over night, and the next morning started for Bulun, a distance of eighty versts (fifty-three miles). The snow at this time was so deep and the weather so bad that it required a train of sixteen reindeer to carry myself and one dog driver and the articles recovered at the cache; for these eighty versts the ordinary time is eight hours, and I had made it before in seven hours. On this occasion it required fourteen hours to make it, for I was obliged to stop at a native village called Ajaket, the natives having lost their way on the river, and bringing up at this place to warm up. I arrived at Bulun on the morning of the 27th of November, having been absent twenty-three days.”

Mr. Melville estimated that on this first search he had traveled about six hundred and sixty-three miles. He had, without knowing it, passed near to the spot where the party for whom he was looking lay dead; but it was plain that now in the depth of winter, and at a distance from necessary supplies, it was impossible to make further search, either for the people of the first cutter, or for those of the second cutter, about whom no syllable had yet reached him. He determined therefore to remove the men who had remained behind when

Lieutenant Danenhower went southward, and return in the spring for a further search. Accordingly he went forward himself to prepare the way, and was followed by Bartlett in charge of the whaleboat party, who came up with him at Verkeransk, the first place of any importance. Here he made provision for the further transportation of the party to Yakutsk, and also took advantage of the presence of an English-speaking Russian to write a full letter to the Espravnik, or head man of the district, giving explicit instructions with regard to the recovery of any of the people, or their remains, and such effects as might be found.

Mr. Melville finally reached Yakutsk December 30, 1881, and there found himself in communication with his government, and with the authorities at St. Petersburg. Mr. Danenhower with his party had preceded him about a fortnight, and Bartlett and the rest of the whaleboat party arrived on the 3d of January, 1882. It was clear that nothing would be gained by maintaining a large party for the spring search, as the necessary supplies for the long journeys were difficult to procure, and Mr. Melville therefore retained only Nindemann and Bartlett to assist him in the further search, and gave the other nine men in charge of Lieutenant Danenhower, with instructions to proceed to Irkutsk, and thence to the Atlantic seaboard on their way to America. He gave him also the articles, including log-books and records left in the huts, which he had recovered from Captain De Long's party.

Lieutenant Danenhower started from Yakutsk January 9, 1882, and reached Irkutsk, a distance of over nineteen hundred miles, on the 20th of the same month. One of the men, John Cole, was suffering from mental aberration, and required a special attendant. Lieuten-

ant Danenhower himself had not fully recovered the use of his right eye, but the oculist at Irkutsk advised him that it would soon be well, and he telegraphed for permission to remain and hire a steamer with which to make search for Lieutenant Chipp's party in the spring and summer; and that two line officers should be sent to assist. The entire party with him also volunteered to remain and assist in the search. The permission to remain was at first given, but Mr. Danenhower cabled that his eyes were in very bad condition, the right eye completely disabled, and the left one affected through sympathy; whereupon the order was revoked. He was detained by the oculist, and while waiting, Mr. J. P. Jackson, special correspondent of the "New York Herald," arrived at Irkutsk, on his way to the Lena Delta. By order of the Department, the seaman L. P. Noros, was detailed to accompany him, and when Mr. Jackson and Noros left for Yakutsk, March 12th, Lieutenant Danenhower and the remainder of his charge set out for St. Petersburg. At Nischnendinsk, which they reached on the 17th, a telegram came stating that Lieutenant Giles B. Harber, U. S. N., who had been sent with Master W. H. Schuetze to search for Lieutenant Chipp and his party, was on his way, and they waited here for him. Lieutenant Harber, after a conference with Lieutenant Danenhower, when the entire company volunteered to join him in the search, telegraphed for permission to take with him the five seamen who were in the best condition, and upon receiving the assent of the Department, followed in the course of Mr. Jackson and Noros, with Leach, Manson, Wilson, Lauterbach, and the Indian Aneguin, while Lieutenant Danenhower set out for home with Mr. Newcomb, the seaman John Cole, who required a special attendant,

and the Chinese steward. They reached New York May 28, 1882.

There were now therefore three parties remaining in Siberia to conduct the search as soon as the season would permit : Mr. Melville, with Nindemann and Bartlett, whom we left at Yakutsk ; Mr. Jackson with Noros ; and Lieutenant Harber with his force of five men.



Stolbovol.

Monument Hill.

Melville's Depot of Supplies and Station at Mat Vai, during Spring Search.

CHAPTER XXII.

THE FINAL SEARCH.

Mr. Melville makes Preparations at Yakutsk. — Russian Assistance. — Rendezvous at Bulun. — Mr. Melville at Geeomovialocke. — Depots Established at Kas Karta and Mat Vai. — The Explorations from these Points. — The Discovery of the Bodies. — The Removal to Mat Vai. — The Entombment. — The Search for Lieutenant Chipp's Party. — The Three Search Parties. — Nindemann's Journey. — Bartlett's Journey. — Mr. Melville's Journey. — Meeting at Geeomovialocke. — Mr. Jackson and Noros. — The Journey to Yakutsk. — Lieutenant Berry and Ensign Hunt. — The Return Home. — Lieutenant Harber's Search. — The Alliance.

As soon as Lieutenant Danenhower had left Yakutsk for Irkutsk, January 9, 1882, Mr. Melville began his preparations. He was fortified with a dispatch which he had received from the Secretary of the Navy, which read: —

“Omit no effort, spare no expense in securing safety of men in second cutter. Let the sick and the frozen of those already rescued have every attention, and as soon as practicable have them transferred to milder climate. Department will supply necessary funds.”

When Tchernieff, the Governor of Yakutsk, saw this dispatch, he recognized that it was an official telegram from the United States government, and informed Mr. Melville that the whole force of Russia at the command of the Governor was at his service, and that there was no limit to the demand which he might make for money, provisions, or people. It was necessary to have tobacco,

food, and clothing supplied from Yakutsk, and transported over the mountains in midwinter on pack-horses, reindeer sleds, and dog sleds to the Lena Delta, the distance to the Arctic Ocean, by post road, being over fifteen hundred miles. Mr. Melville engaged three interpreters to accompany him and his assistants, for, owing to the scarcity of teams on the road, it was necessary to move in three separate parties.

Nindemann and his interpreter started for Bulun January 19th; Bartlett and his interpreter, with the provision train, followed on the 23d, and Mr. Melville remained until the 27th, when he proceeded, accompanied by Captain Grönbeck, the captain of the steamboat *Lena*, which plied on the Lena River. With them also went the *Espravnik* of the district, who was to lend the authority of the government in all their dealings with the natives. Mr. Melville had provided himself with the most recent chart of the Lena Delta which he could obtain, and this bore Nordenskjöld's corrections, which were of course not available when the *Jeannette* had set out on her voyage. This chart itself was still very imperfect and was rendered much more complete after Mr. Melville and his companions had traversed the Delta.

Nindemann reached Bulun February 12th, and Mr. Melville and Bartlett on the 17th and 18th. A month was required to collect dog teams and provisions, and to establish depots of supplies at Mat Vai and Kas Karta, which Mr. Melville had selected as the most convenient rendezvous. In making the necessary arrangements Mr. Melville was obliged to revisit *Geomovialocke*, and to repeat much of the severe experience in travel of the November before. He was, however, in far better condition for his work than then; for not

only had he himself recovered from the effects of his exposure, but he was relieved of the care of a partially disabled party, and he was armed with all necessary authority and means. Accordingly he settled all the claims which the people in the district had against the whaleboat party, inquired into the conduct of Kusmah, whom he suspected to have played them false when he had sent him from Geeomvialocke to Bulun, brought to some sort of justice the petty authorities who had refused proper care of his people when they were in their wretched condition, and summarily broke up, with the Espravnik's aid, a ring which had been formed to get control of all the provisions of the country and advance the price to the Americans.

In the course of this month he learned much of the poverty of the natives, and of the risks of starvation and freezing which were run in this bleak and destitute land. Once at least he was able to rescue one party from starvation, and by energy and resolution he carried through his plans until, on the 16th of March, he was able to set out in company with Nindemann upon his first search.

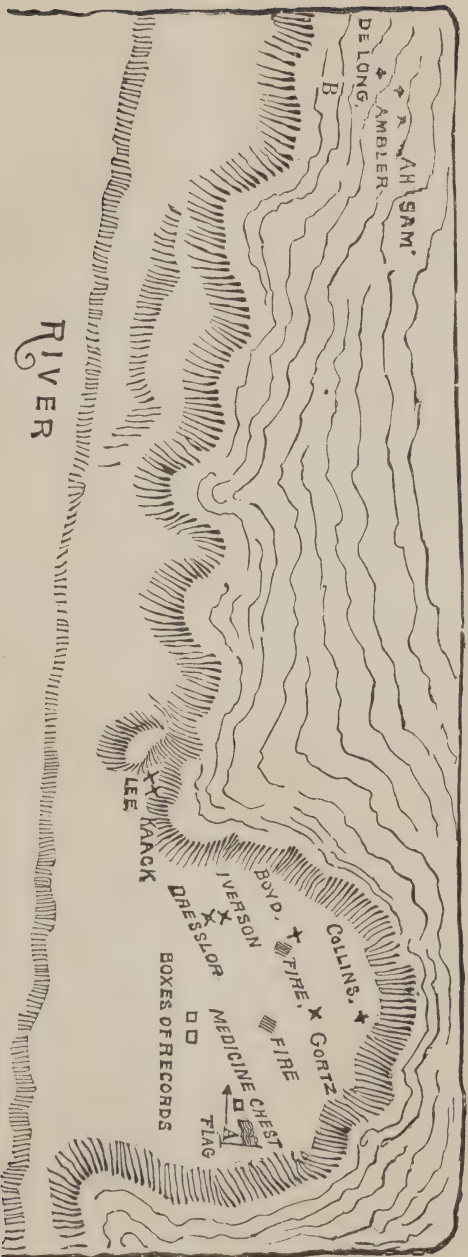
They left Kas Karta and found the place, Usterda, where Captain De Long had crossed the river to the westward. Nindemann at once recognized the spot, and they now made search for the hut where Ericksen had died; for if they could once find that, their track afterward would be greatly simplified. They inquired of their native attendants for all the huts in the neighborhood, describing particularly the one for which they were in search, and following the clues given them went in every direction, but without success. The snow lay deep on the ground, effectually covering any traces of previous travelers, and they were themselves

sometimes fighting the storm, sometimes running before it.

They were compelled to return to Kas Karta, and now having made up another team for Bartlett, Mr. Melville sent him to Mat Vai with instructions to work his way northward on the largest branch of the river he might find, while he and Nindemann would work from the northward to the southward. Both parties left at the same time. Bartlett ran for Mat Vai, which he reached, but Mr. Melville and Nindemann were obliged to camp out all night in the snow, only reaching Qu Vina the next day, where Bartlett afterward joined them. They were all working at terrible disadvantage, owing to the storm which raged almost incessantly, but at length, leaving Bartlett at Qu Vina, Mr. Melville and Nindemann set out from Mat Vai when the weather had cleared, with the purpose of going to the westward along this bay from headland to headland as far as the mouth of each river.

“We followed the bay,” says Mr. Melville in his narrative, “until late in the evening, having visited all the headlands; finally we came up to the large river with the broken ice. I jumped up on the headland or point of land making down in the bay and found where an immense fire had been made. The fire bed was probably six feet in diameter, large drift-logs hove into it, and a large fire made, such as a signal fire. I then hailed Nindemann and the natives, saying, ‘Here they are!’ They thought that I had found the place where the De Long party had been. Nindemann came up on the point of land, and said that neither he nor Noros had made a fire of that kind, only a small fire in the cleft of a bank; but he was sure that this was the point of land they had turned going to the westward,

and that this was the river along which he and Noros had come. I asked them if the Yakutsks made a fire like that, and they said no; that they only made small fires. I then concluded that De Long and his party had been here, but supposed they had turned, as Nindemann and Noros had, down to the westward, and expected to find them somewhere to the westward. Nindemann had described an old flat-boat that lay on the bank of the river a short distance up this same river. If we found the flat-boat that would show this to be the river on which Ericksen's hut was located. I then started up the river with the intention of going as far as Ericksen's hut, getting the relics there known to be in the hut, and to return to the point of land and continue the search between the point where the fire had been and Mat Vai. Nindemann started with his dog team in advance, some four or five hundred yards, and while running along sighted the flat-boat. I followed after him, sitting on the sled, facing the bank. The bank here was twenty-five or thirty feet high above the bed of the river, and the snow filled in with a natural slope to the height of the bank, and passing probably forty or fifty feet out to the river; but the wind blew so fiercely in this section that very little snow lies on the high lands or Tundras. The snow was blown into the valleys, forming banks equal in depth to the depth of the natural bank of the river. It is the custom of the people here in making a search to go facing the bank of the river, and when they see anything to attract them, drop off the sled and examine it, or pick it up and go on. In this manner about five hundred yards from the point where the fire had been, I saw the points of four sticks standing up out of the snow about eighteen inches, and lashed to-



RIVER

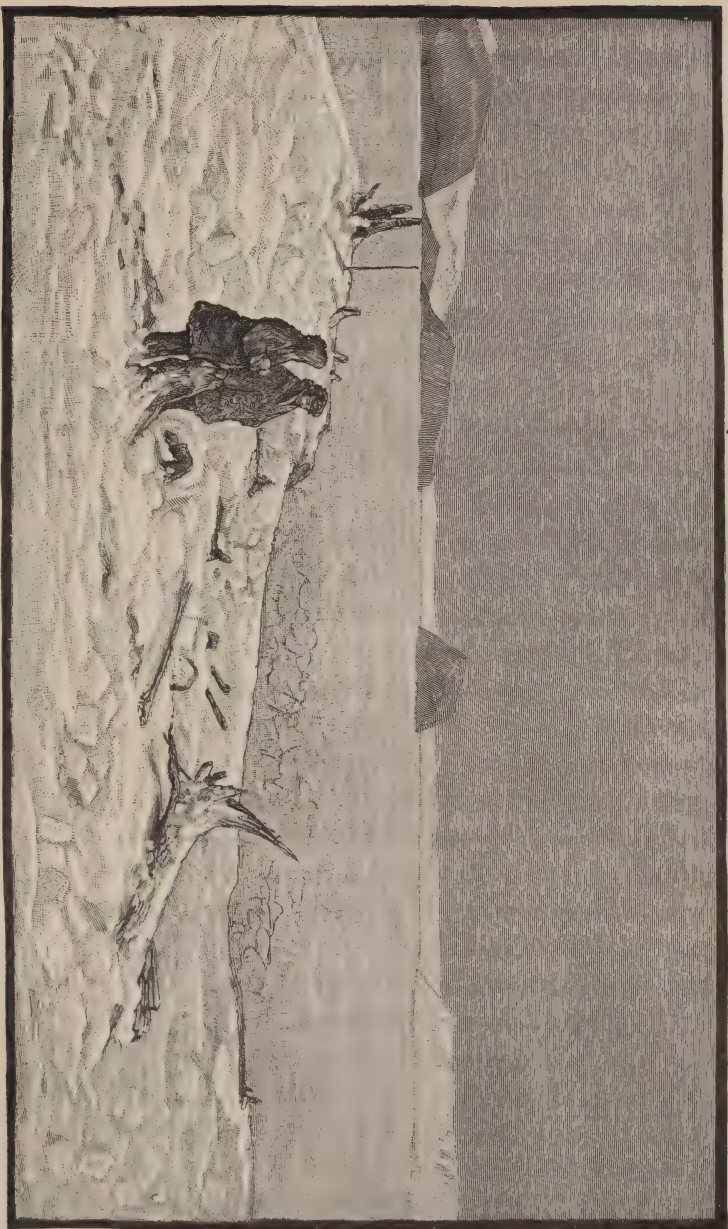
PLAN OF THE LAST CAMP, SHOWING THE POSITION IN WHICH THE BODIES WERE FOUND. A to B 1000 yards.

gether with a piece of rope. Seeing this I dropped off the sled, and going up to the place on the snow bank, I found a Remington rifle slung across the points of the sticks, and the muzzle about eight inches out of the snow. The dog-driver seeing I had found something came back with the sled, and I sent him to Nindemann to tell him to come back, he having gone as far up the river as the flat-boat. When they returned I started the natives to digging out the snow-bank underneath the tent poles. I supposed that the party had got tired of carrying their books and papers, and had made a deposit of them at this place, and erected these poles over the papers and books as a landmark, that they might return and secure them in case they arrived at a place of safety. Nindemann and I stood around a little while, got upon the bank, and took a look at the river. Nindemann said he would go to the northward, and see if he could discover anything of the track and find the way to Ericksen's hut. I took the compass and proceeded to the southward to get the bearings of Stolbovoi and Mat Vai, so that I might return there that night in case it came on to blow.

“In proceeding to a point to set up the compass I saw a tea-kettle partially buried in the snow. One of the natives had followed me, and I pointed out to him the kettle, and advancing to pick it up I came upon the bodies of three men, partially buried in the snow, one hand reaching out with the left arm of the man raised way above the surface of the snow — his whole left arm. I immediately recognized them as Captain De Long, Dr. Ambler, and Ah Sam, the cook. The Captain and the Doctor were lying with their heads to the northward, face to the west, and Ah Sam was lying at right angles to the other two, with his head about the

doctor's middle, and feet in the fire, or where the fire had been. This fireplace was surrounded by drift-wood, immense trunks of trees, and they had their fire in the crotch of a large tree. They had carried the tea-kettle up there, and got a lot of Arctic willow which they used for tea, and some ice to make water for their tea, and had a fire. They apparently had attempted to carry their books and papers up on this high point, because they carried the chart case up there, and I suppose the fatigue of going up on the high land prevented their returning to get the rest of their books and papers. No doubt they saw that if they died on the river bed, where the water runs, the spring freshets would carry them off to sea.

“I gathered up all the small articles lying around in the vicinity of the dead. I found the ice journal about three or four feet in the rear of De Long; that is, it looked as though he had been lying down, and with his left hand tossed the book over his shoulder to the rear, or to the eastward of him. I referred to the last pages of the journal, and saw where the next man had died after Ericksen. The first man that died after Ericksen was Alexey, the Indian hunter. The journal stated that he had died in the flat-boat; that was about five hundred yards from where we then were. Referring to the journal, I found that the whole of the people were now in the lee of the bank, in a distance of about five hundred yards. In the mean time, the native that had gone for Nindemann had brought him back. We covered the bodies with a piece of old tent cloth. . . . The natives continued to dig underneath the tent-poles, at the edge of the bank, and after a while struck the earth and found nothing. In the mean time it came on to snow and blow. I told the natives to dig away



FINDING THE BODIES OF CAPTAIN DE LONG AND HIS COMPANIONS.

for a spell, and just before night set in we found the head of one man and the feet of another underneath the snow-bank. The natives being frightened jumped out of the hole quickly. I told them to dig a little longer, that the books might be there; and after digging for a spell they threw out a box of books, and exposed the shoulders of a third person. It was about twenty versts (about thirteen miles) across the bay to Mat Vai, where our camp was. We stuck a stick of timber in the hole where we were digging, gathered up some traps we found, and returned to Mat Vai."

The next day, having sent for Bartlett, Mr. Melville ordered the two men, with the entire force of natives, back to the spot where they had discovered the bodies, with instructions to bring to Mat Vai at night all that they should uncover. He himself remained in the hut with the interpreter, to prepare at once dispatches and letters for his own government and the Russian. Two days were thus occupied, and at the close of that time there seemed to be nothing further to be recovered save the body of Alexey; and Captain De Long's record that they had buried him in the river explained the failure to find him. Mr. Melville offered a reward to the natives if they should discover Alexey's body, but desisted from further search.

It then became necessary to find a place for burial. "The whole of the territory," says Mr. Melville, "to the northward of where I was, and the headland where De Long and Ambler had died, was sometimes covered with ten or fifteen feet of water. The whole of that portion of the Delta is covered at some seasons of the year with ice and snow, and is carried away by the floods that come down the river. When the snows melt up the river the floods come down the river, rush over

and on the ice like an ocean bore, and carry away everything. The nearest place of safety was the foothills to northward of the mountains that form the banks of the Lena River proper. About ten versts (about seven miles) to the southward of Mat Vai there was a little whale-back rock between three and four hundred feet high. I selected a flat spot on the top of that mountain, and started the hands at work to dig a hole in the rock in which to set up a cross."

Nindemann and Bartlett were set at work with a number of the natives to break up the old flat-boat to get timber to make a box; and a spruce spar was found which was hauled to Mat Vai, and used in the construction of a cross.

It was on the 23d of March that Mr. Melville had found the first bodies, and on the 7th of April he had completed his last offices. Every article carried about the persons of the dead was carefully removed, to be brought home, excepting a small bronze crucifix found upon Mr. Collins, and left upon his breast. The bodies were placed in the box, and the box securely covered. Then a pyramidal structure of timber and stone was raised over the box, and the cross, with its inscription cut deep into the wood, firmly fixed above the tomb. Nindemann, meanwhile, had succeeded in finding the hut where Ericksen had died, and brought away the gun, record, and epitaph board which had been left there. Nothing more could now be done for those who had perished in this lonely spot, and it remained to make search for the fate of the second cutter, under command of Lieutenant Chipp.

It will be remembered that the three boats had parted in the gale of September 12th off the Siberian coast. We have followed the fortunes of the first cut-

ter and of the whaleboat. No sign had ever been given of the second cutter after she was lost to sight, and there could scarcely be a doubt that she went down in the gale, an end barely avoided by the other boats. But Mr. Melville and his companions could not leave the Delta until every possible search had been made.

Mr. Melville now withdrew the whole of his force to Kas Karta, to make that the starting point of his search. He provided himself with dog-drivers and guides who were well acquainted with the east and north coasts of the Delta, established depots of supplies at convenient points, and then divided his force into three search parties. He sent Nindemann and Bartlett with four dog sleds and drivers up the main river to Barkin, where they were to separate, Bartlett to take the southern track, the east coast of the Delta, and visit all the headlands, running up rivers as far as provisions would allow, and continuing until he came to Geomovialocke. Nindemann, after he parted company with Bartlett at Barkin, was to follow along the north coast of the Delta in the same manner as far as the river Osoktok, and finally to return to Kas Karta, there to wait Mr. Melville's arrival.

Mr. Melville himself started to the northward and westward, followed the coast in the same manner, and returned finally to Kas Karta about the 21st of April. As an illustration of the imperfect communication between parts of the Delta, it may be noticed that Mr. Melville found natives who were entirely ignorant of the landing of any Americans on the coast, or of the various searches which had been made back and forth across the country.

He found Nindemann at Kas Karta, and both pro-

ceeded to Geeomvialocke, where they found Bartlett. They had, in their separate searches, outlined the entire coast of the Delta, run up the mouths of all the streams, held intercourse with natives in every direction, and the total absence of any evidence respecting Lieutenant Chipp and his party left no room for doubt in their minds as to the fate of the second cutter.

They had been at Geeomvialocke one night only, when word was brought them that there were Americans at a village near by. Mr. Melville at once drove over and found Mr. Jackson and Noros. Mr. Jackson was desirous of visiting the tomb of Captain De Long and his party, and left them to go thither; while Mr. Melville, Nindemann, and Bartlett set out for Yakutsk, taking, however, the route by the river Jana, not before traversed, that no possible stone should be left unturned in searching for Lieutenant Chipp.

While at the mountain divide between Verkeransk and Yakutsk, they were met by Lieutenant Berry and Ensign Hunt, members of the relief expedition sent out by the United States Government. This party had left San Francisco in the U. S. S. Rodgers in June, 1881, and after cruising about Wrangel Island had gone into winter quarters in St. Lawrence Bay, on the northeast coast of Siberia. Here the steamer had caught fire and burned at the end of December, and while most of the party made their way to St. Michael's and thence back to San Francisco in the following spring, Colonel Gilder, Lieutenant Berry, and Ensign Hunt, in pursuit of the main object of the Rodgers expedition, travelled west, traversed Siberia and were now in the Yakutsk district. They joined Mr. Melville, who gave them the information which he had, and kept on his way with them, arriving at Yakutsk about the 8th of June.

Here he expected to find Lieutenant Harber, of whose movements he had heard, but learned that he was then at Vittim, nearly seven hundred miles up the Lena River, getting vessels ready for an exploration of the Delta by water. He hastened forward by steamer, hoping to intercept him, but they passed in the night, as Mr. Melville learned when he reached a station called Olekma, where he found a letter from Lieutenant Harber. Lieutenant Berry decided to send Ensign Hunt, who had volunteered, back to join Lieutenant Harber, and Bartlett requested and obtained leave to accompany him. Nindemann also wished to be of the party, but Mr. Melville was unwilling to increase Lieutenant Harber's number without better knowledge of his resources. At this point, accordingly, Ensign Hunt and Bartlett turned back to Yakutsk, while Lieutenant Berry, Mr. Melville, and Nindemann kept on to Irkutsk, where they were joined by Noros, whom they found there with Mr. Jackson, and from Irkutsk they made their way to the Atlantic sea-board and thence to America.

A thorough search of the Delta was made by Lieutenant Harber and his party during the summer, but without avail, and in the autumn Ensign Hunt returned to the United States, bringing with him Bartlett, Leach, Lauterbach, and Manson. Wilson had been ill and had preceded them, while the Indian Aneguin had died of small-pox on the journey. Lieutenant Harber and Master Schuetze asked leave of the Secretary of the Navy to remain another year and make a still more thorough search, part of their plan being to visit Semanovski Island. Permission was given, and they were charged also with the duty of bringing back to the United States the remains of Lieutenant-Com-

mander De Long and his comrades from the tomb on the Lena Delta, for which purpose the United States government had appropriated the sum of twenty-five thousand dollars. They made the search, but did not visit Semanovski Island, and in the spring of 1883 reached Yakutsk, bringing with them the remains.

One further attempt by the United States government to communicate with the Jeannette during her absence should be noted. In the spring of 1881 the United States Steamer Alliance, Commander George H. Wadleigh, at the instance of Mr. Bennett, was ordered to search for the missing vessel between Greenland, Iceland, and the coast of Norway and Spitzbergen, with instructions to proceed as far north as $77^{\circ} 45'$, if it should be possible to get there without danger from the ice. The Alliance cruised throughout the summer and took every means to learn of the Jeannette, and to make known her errand along the coasts and among the fishing vessels, but returned to the United States in the fall without accomplishing the main object of her cruise, though she ascended as high as latitude 82° N., and showed how much could be done with a vessel not originally designed for Arctic exploration.

CHAPTER XXIII.

CONCLUSION.

The Court of Inquiry. — The Points of Instruction. — The Finding of the Court. — The Voyage of the *Jeannette* and its Word to the Reader.

THE loss of the *Jeannette* and the subsequent fate of the commanding officer and others of the ship's company were made the subject of a court of inquiry, according to the rules of the United States Navy. The court was summoned by the Secretary of the Navy to meet at Washington, October 5, 1882. Commodore William G. Temple was appointed president of the Court, Captain Joseph N. Miller and Commander Frederick V. McNair, members, and Master Samuel C. Lemly, judge advocate. It was instructed "diligently and thoroughly to investigate the circumstances of the loss in the Arctic Seas of the exploring steamer *Jeannette*, and of the death of Lieutenant-Commander George W. De Long and others of her officers and men." It was also "carefully to inquire into the condition of the vessel on her departure, her management up to the time of her destruction, the provisions made and plans adopted for the several boats' crews upon their leaving the wreck, the efforts made by the various officers to insure the safety of the parties under their immediate charge, and for the relief of the other parties, and into the general conduct and merits of each and all the officers and men of the expedition."

Under this comprehensive order the court conducted its examination during eighty-five days, and received the testimony of the survivors of the expedition, and of a number of persons who had been personally cognizant of the construction, alteration, and equipment of the Jeannette. The log-books and journals of Captain De Long were also read by the court as a part of the testimony. The records of the proceedings of the court form No. 108 of the Executive Documents of the Second Session of the 47th Congress, House of Representatives. The finding of the court is reprinted in full in the Appendix¹ to this volume. It is a summary of the narrative which has been given at length, and a professional judgment upon those points which were contained in the instructions to the court.

The reader who has followed attentively the history of the expedition from its inception to its melancholy close will have anticipated the judgment of the court, and will be enabled to enrich its decisions with a volume of illustrations. In one matter, the proceedings of the court furnish fuller information than this book. It was not thought necessary to burden the unprofessional reader with a detailed description of the measures taken to strengthen the Jeannette for her northern voyage; enough has been given to indicate the character and extent of the work done. In the testimony before the court, the observations of the officers of the Mare Island Navy Yard, and the experience of the officers of the Jeannette, furnish additional evidence; and the reader who has attended to the vivid description which Captain De Long gives of the terrible power of the restless ice will scarcely need to be reminded that no vessel built by the hand of man could

¹ See Appendix I.

resist the ice under certain conditions; and that the Jeannette proved herself in the long struggle to have been exceptionally staunch and seaworthy.

Of the management of the ship up to the time of her loss no evidence could be so conclusive as the daily record, begun with so much eagerness to note every interesting and important fact, continued under circumstances of so much discouragement, and constantly suggestive of the resources of the commander and his associates, their unflagging zeal, their versatility, their cheerful resolution, their devotion to the incidental objects of the expedition, and their thoughtfulness for the health and comfort of the crew. The final loss of the vessel was beyond the power of man to foresee or prevent. "Any vessel in like position," says the court, emphatically, "no matter what her model might have been, or however strongly constructed, and subjected to the same pressures as those incurred by the Jeannette, would have been annihilated." That the abandonment of the vessel was orderly, and the retreat managed with wisdom appears from the fact that "ninety days after the destruction of the Jeannette the officers and men were in fair condition, notwithstanding their terrible journey." So reads the finding of the court; and the narrative drawn from Captain De Long's ice journal, although necessarily compact and more in the form of notes than of an extended record, affords abundant evidence of the strain under which the commander moved through that fearful summer, and of the discipline and order which prevailed among his brave comrades.

The final point upon which the court was to inquire was as to "the general conduct and merits of each and all the officers and men of the expedition." The finding is as follows:—

“ There is conclusive evidence that aside from trivial difficulties, such as occur on shipboard even under the most favorable circumstances, and which had no influence in bringing about the disasters of the expedition, and no pernicious effect upon its general conduct, every officer and man so conducted himself that the court finds no occasion to impute censure to any member of the party. In view, then, of the long and dreary monotony of the cruise, the labors and privations encountered, the disappointment consequent upon a want of important results, and the uncertainty of their fate (and apart from a natural desire to tread lightly on the graves of the dead), the general conduct of the *personnel* of the expedition seems to have been a marvel of cheerfulness, good fellowship, and mutual forbearance, while the constancy and endurance with which they met the hardships and dangers that beset them entitle them to great praise. Beside the mention already made, however, special commendation is due to Lieutenant-Commander De Long for the high qualities displayed by him in the conduct of the expedition; to Chief-Engineer Melville for his zeal, energy, and professional aptitude, which elicited high encomiums from his commander, and for his subsequent efforts on the *Lena Delta*; and to Seamen Nindemann and Sweetman for services which induced their commander to recommend them for medals of honor.”

This decision was reached by the court after the fullest hearing of testimony. The reader of “ The Voyage of the Jeannette ” is in possession of the same general evidence. It is the record of an expedition which set out in high hope, and returned broken and covered with disaster. It is also the record of lives of men subjected to severer pressure than their ship met from

the forces of nature. The ship gave way; the men surmounted the obstacles, and kept their courage and faith to the end. It is, above all, the record of a leader of men who entered the service in which he fell with an honorable purpose and a lofty aim; who endured the disappointment of a noble nature with a patience which was the conquest of bitterness; who bore the lives of his comrades as a trust reposed in him; and who died at his post with an unflinching faith in God whom he served and loved.

The voyage of the *Jeannette* is ended. The scientific results obtained were far less than had been aimed at, but were not insignificant. Something was added to the stock of the world's knowledge; a slight gain was made in the solution of the Arctic problem. Is it said that too high a price in the lives of men was paid for this knowledge? Not by such cold calculation is human endeavor measured. Sacrifice is nobler than ease, unselfish life is consummated in lonely death, and the world is richer by this gift of suffering.



Monument Hill, Lena Delta.

APPENDIX.

APPENDIX A. (See page 48.)

Translation of the Opinion of M. Wilfrid de Fonvieille, Aëronaut, as to the Best Manner of preparing Balloons for Use in the Polar Regions.

THE captive balloon established by M. Henry Giffard last summer in the courtyard of the Tuilleries may be considered as offering the type which the constructors of balloons intended for use in the Polar explorations should adopt for model. But in reducing considerably the proportions (which would be absolutely necessary) it becomes indispensable to introduce in the construction of such balloons important modifications which will necessarily be expensive.

It would be imprudent to construct a balloon capable of resisting powerful winds without employing two silk coverings, between which should be placed a strong lining of caoutchouc. The external covering of silk can be made much lighter than the other. This should be covered in its turn by a thin coating of caoutchouc, covered again by muslin varnished over with common flaxseed oil. The balloon of M. Giffard was composed of two linen coverings separated by a lining of unvulcanized India rubber. The two linen coverings can be replaced by two silk tissues, but it is impossible to suppress the external coat of India rubber, which is intended to prevent the oil from penetrating inside and attacking the non-vulcanized rubber as well as the silk covering, which gives to the balloon all its power of resistance, and which, combined with the caoutchouc, imparts to the whole a sufficient elasticity.

But little reliance should be placed on the combinations so imprudently eulogized by aëronauts, but more especially on the so-called *Meudon varnish*, about which the officers of the Engineers make such a mystery.

The seams should be worked by hand, and should be made very

solid. It is important to diminish as much as possible the number of the sections of the cloth composing the balloon, and this can be done by having it woven especially for the purpose; it is also necessary that the greatest care should be taken to insure regularity in cutting them. The joinings should be covered with bands of varnished cloth, but these bands should be made as thin as possible.

It is also advisable to strengthen the head of the balloon round the valve. For this purpose two coverings of the cloth should be used, with a lining of caoutchouc between them, the whole covered with muslin. This might be woven specially, just as a cotton night-cap is made, and extended to a distance of two metres from the valve in spherical sections, arranged in divisions of four or six, as might be deemed advisable.

All the parts of the balloon in the neighborhood of the valve should be varnished internally and externally, to avoid escape of gas by the seams.

The valve should be constructed according to the system of M. Giffard, but should be very much lighter. A model of this valve has been made by M. Comme, and is to be seen at No. 50 Rue Rodier, Paris, at the Exhibition of the Meteorological Academy.

The netting should be constructed in the ordinary manner.

It is not necessary to suppress the knots, and yet if means could be found to execute this part of the work without them it would be found advantageous. It is not absolutely necessary to have a safety valve. It would be preferable to terminate the neck of the balloon by an arrangement of the cloth susceptible of being hermetically contracted, and to which the aeronaut could easily ascend.

There is no means of dispensing with the use of hydrogen gas as the ascending power, and this necessitates the transportation of a large quantity of sulphuric acid, — say from seven to eight thousand kilogrammes for every thousand cubic metres. It would be possible to diminish this quantity by taking the acid, carefully rectified, or even by taking anhydric acid, if the cost be not too great. The iron ought to be in shavings and not in dust. A portion of them should be taken in boxes or barrels not liable to oxydation, which would cause a loss of the acid and of the weight. Before the iron is used it should be well brushed or shaken.

For generators wine or spirit casks which have already served for these liquids can be used with advantage, if care be first taken to see that they do not leak. It would also be advisable to use the apparatus called *l'appareil de dégagement continu*, employed by M.

Giffard, or something analogous to it. Nevertheless, the loss of gas, which is inevitable when the constituent elements are renewed, constitutes a serious objection. It is to be regretted that experiments on the decomposition of steam from water by iron have not been made, for this process would be infinitely preferable. But I dare not recommend it in the imperfect state of information which the scientific world is in with regard to it. And yet the aëronauts of the First Republic inflated their balloons with it during the campaign of 1794.

If it were desired to inflate the balloons of the Polar expedition with decomposed steam, it would be necessary to train the crew of the *Jeannette* to its employment.

It would be equally indispensable to train the aëronauts by preliminary ascensions at sea, in the neighborhood of vessels, and with attachments composed of guide-ropes with running knots.

The car should be unsinkable, and shaped like a boat or like an ice-sledge, with the anchors and guide-ropes disposed in such a manner that the draft should always be effected from the sides, and not from the ends.

Ascensions should not be made when the thermometer is too low, for there is then a probability that the caoutchouc might be affected by the frost, and might crack.

The flaxseed-oil varnish is the only thing to be relied on, if it be desired to make ascensions under such difficult circumstances.

Efforts should be made to find some means of ascending and descending without sacrificing gas. The experiments which I am making in this regard will be concluded before the end of May, and I shall then be able to give more precise details on the subject.

WILFRED DE FONVIEILLE.

PARIS, 15 March, 1879.

APPENDIX B. (See page 67.)

Shipping Articles for the Naval Service for Persons enlisting on Board of the Arctic Steamer Jeannette.

WE, the subscribers, Petty Officers, Seamen, and others, do, and each of us does agree to and with Lieutenant George W. De Long of the United States Navy :

In the first place, we do hereby agree for the considerations herein-after mentioned, to enter the service of the Navy of the United States, and in due and seasonable time to repair on board the Arctic Steamer *Jeannette*, for a cruise to the Arctic Regions, for the purposes of

discovery, exploration, and scientific research; and we do bind ourselves to discharge our several duties or services to the utmost of our power and ability; and to be in everything conformable and obedient to the several requirings and commands of the officers who may, from time to time, be placed over us.

Secondly, we do also oblige and subject ourselves to serve well and truly in carrying out the objects of said cruise to the Arctic Regions from the date of our signing these to the day on which we are discharged from the Naval Service of the United States by competent authority.

Thirdly, understanding and appreciating fully the hardships and dangers to which we may be subjected, and the varied and peculiar duties which we may be called upon to perform, whether as members of a ship's company, portions of an outlying and removed colony, or forming one of a party told off for any particular duty, whether afloat or ashore, on ice or over it, we none the less cheerfully and willingly bind ourselves to unhesitatingly obey such orders as may be given us, and devote to the carrying into effect thereof all our strength and ability; and to strictly observe, comply with, and be subject to such laws, regulations, and discipline of the Navy, as are or shall be established by the Congress of the United States, or other competent authority, and to such especial laws, regulations, and discipline as have been established in this particular case.

Fourthly, recognizing the peculiar situations in which we may be placed, and the extreme importance of carefully guarding against waste or improvidence of any kind, we do each severally bind ourselves to watch over and care for all articles of food, raiment, and equipment; to accept such establishment of food, both as to quantity and quality, as may be directed from time to time by the commanding or other authorized officer; to wear such articles of dress as we may be ordered to wear, changing, altering, or modifying the same at the discretion of said commanding or otherwise authorized officer; and to preserve faithfully the good condition and usefulness of whatever articles of arms or equipment of any kind may be entrusted to our care.

Fifthly, the said Lieutenant George W. De Long, for and in behalf of the United States, does hereby covenant and agree to and with the said seamen, petty officers, and others who have hereunto signed their names, that they and each of them shall be paid, in consideration of such services, the amount per month which, in the column hereunto annexed, headed "Wages per month," is set opposite to their names respectively; or the wages due to the ratings which may, from time to

time be assigned to them during the continuance of their service aforesaid; and likewise to advance to each and every one of them at entrance, due security for the same being first given, the amounts set opposite their respective names in the column headed "Wages advanced," the receipt of all which they do hereby severally acknowledge. It is understood, however, that such payments as are mentioned above shall cease to be made personally upon the departure of the *Jeanette* from San Francisco, California. The amounts becoming due from time to time shall be regularly credited and accounted for in the books of such pay or disbursing officer as may be indicated beforehand by the Honorable Secretary of the Navy, and such allotments of pay as are desired by the said petty officers, seamen, and others, and allowed by the said Secretary of the Navy, shall be paid by the designated pay or disbursing officer. In the event of no such allotment being made, the amounts becoming due shall be carried forward on the books of the designated pay or disbursing officer until the return of the individual entitled to receive the same, and his discharge from the naval service of the United States; and in the event of the death or loss of any one of the said petty officers, seamen, or others, the amount due and remaining unpaid at the date of such death or loss shall be paid to the widow or next of kin, as provided for by existing laws.

APPENDIX C. (See page 68.)

Muster Roll of Officers and Men on Board the Arctic Steamer Jeanette at Date of Sailing from San Francisco for the Arctic Ocean, July 8, 1879.

Lieutenant George W. De Long, U. S. N.	. . .	<i>Commanding.</i> ¹
Lieutenant Charles W. Chipp,	" . . .	<i>Executive.</i>
Master John W. Danenhower,	" . . .	<i>Navigator.</i> ²
Passed Assistant Engineer Geo. W. Melville, U. S. N.		<i>Chief Engineer.</i> ³
Passed Assistant Surgeon James M. Ambler, U. S. N.		<i>Surgeon.</i>
*Mr. Jerome J. Collins		<i>Meteorologist.</i>
*Mr. Raymond L. Newcomb		<i>Naturalist.</i>

¹ Promoted 1 November, 1879, to be Lieutenant-Commander.

² Promoted 2 August, 1879, to be Lieutenant.

³ Promoted 4 March, 1881, to be Chief Engineer.

* Shipped as seaman, U. S. Navy. The men were all enlisted in the Navy under the Special Shipping Articles given in Appendix B. Every man before acceptance was subjected to a searching physical examination.

*Mr. William Dunbar	<i>Ice Pilot.</i>
*John Cole	<i>Boatswain.</i>
*William Nindemann	<i>Ice Qr. Master.</i>
*Alfred Sweetman	<i>Carpenter.</i>
Walter Lee	<i>Machinist.</i>
James H. Bartlett	<i>Fireman.</i>
Geo. W. Boyd	<i>2d class Fireman.</i>
John Lauterbach	<i>Coalheaver.</i>
Walter Sharvell	"
Nelse Iversen	"

Seamen.

Louis P. Noros,	Frank E. Manson,
Adolph Dressler,	Carl A. Görtz,
Henry Wilson,	Herbert W. Leach,
Peter E. Johnson,	Edward Starr,
Hans Halmoi Ericksen,	Henry D. Warren,
Heinrich H. Kaack,	Albert G. Kuehne.
*Charles Tong Sing	<i>Steward.</i>
*Ah Sam	<i>Cook.</i>
Ah Sing	<i>Cabin boy.</i>

APPENDIX D. (*See page 166.*)

OFFICERS' BILL OF FARE.

Monday. — Breakfast: Coffee, milk, sugar, bread and butter, bacon, hominy. Dinner: Hard bread, pickles, ox-tail soup, turkey, pie or chicken pie if no bear, potatoes, succotash. Supper: Tea, milk, sugar, bread, butter, boneless ham, apple butter.

Tuesday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, St. Michael's salmon, potatoes. Dinner: Hard bread, pickles, mutton broth with barley, roast mutton, tomatoes, green corn. Supper: Tea, milk, sugar, bread, butter, tongue, corn meal.

Wednesday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, mutton hash. Dinner: Hard bread, pickles, bean soup, pork and beans, raw onions, potatoes, and duff. Supper: Tea, milk, sugar, bread, butter, cold pork, peach butter.

Thursday. — Breakfast: Coffee, milk, sugar, bread, butter, hominy, beef hash. Dinner: Hard bread, pickles, mock-turtle soup, roast beef, canned beans, green peas. Supper: Tea, milk, sugar, bread, butter, beef hash, prunes or dried peaches or canned pears.

Friday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, St. Michael's salmon. Dinner: Hard bread, pickles, pea soup, corn beef, tomatoes and oatmeal, potatoes. Supper: Tea, milk, sugar, bread, butter, cold corn beef.

Saturday. — Breakfast: Coffee, milk, sugar, bread, butter, hominy, corn-beef hash. Dinner: Hard bread, pickles, mutton soup, barley, pemmican if no bear, potatoes, curried rice. Supper: Tea, milk, sugar, bread, butter, pemmican and rice, quince butter.

Sunday. — Breakfast: Coffee, milk, sugar, bread and butter, oatmeal, canned fish, potatoes. Dinner: Hard bread, pickles, beef soup, salt beef if no seal, maccaroni, beets or carrots or onions, duff. Supper: Tea, milk, sugar, bread, butter, kidneys or pig's feet, canned fruit.

Average per day 3 pounds, 15½ ounces each person.

CREW'S BILL OF FARE.

Monday. — Breakfast: Milk, coffee, sugar, bread, butter, sausage if seal the day before, hominy. Dinner: Hard bread, pickles, roast mutton if no bear, potatoes, succotash. Supper: Tea, milk, sugar, bread, butter, mutton hash, apple butter.

Tuesday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, St. Michael's salmon, potatoes. Dinner: Hard bread, pickles, mutton broth and barley, roast mutton, tomatoes, green corn. Supper: Tea, milk, sugar, bread, butter, mutton, cornmeal.

Wednesday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, mutton hash. Dinner: Hard bread, pickles, bean soup, pork and beans, raw onions, potatoes, duff. Supper: Tea, milk, sugar, bread, butter, cold pork, peach butter.

Thursday. — Breakfast: Coffee, milk, sugar, bread, butter, hominy, beef hash. Dinner: Hard bread, pickles, bean soup, roast beef, canned beans, green peas. Supper: Tea, milk, sugar, bread, butter, roast beef, prunes or canned pears or dried peaches.

Friday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, St. Michael's salmon. Dinner: Hard bread, pickles, pea soup, corn beef, tomatoes and ochra, potatoes. Supper: Tea, milk, sugar, bread, butter, corn beef.

Saturday. — Breakfast: Coffee, milk, sugar, bread, butter, hominy, corn beef hash. Dinner: Hard bread, pickles, mutton broth, pemmican if no bear, potatoes, curried rice. Supper: Tea, milk, sugar, bread, butter, pemmican and ground rice, quince butter.

Sunday. — Breakfast: Coffee, milk, sugar, bread, butter, oatmeal, canned fish, potatoes. Dinner: Hard bread, pickles, beef soup, salt

beef if no seal, maccaroni, and potatoes, beets or carrots or onions, duff. Supper: Tea, milk, sugar, bread, butter, seal hash, canned fruit.

Average per day 3 pounds, 15¾ ounces each person.

APPENDIX E. (*See page 251.*)

Extracts from a Memorandum by Dr. Ambler on Ice formed by Sea Water.

THE following observations were made during the winter of 1879–80, at which time the Arctic Steamer Jeannette was beset in the pack to the north and west of Herald Island, in about 72° to 73° north latitude. As we were out of reach of land, we had to depend for our supply of water either upon the melting of snow or sea water ice, or upon distillation of the sea water itself. The statements of previous explorers that they had no difficulty in procuring a sufficient supply of ice, yielding a pure and potable water, had been accepted, and we had no doubt but that our own experience would be the same.

Expeditions wintering along the land can, of course, always draw their supply of fresh water ice from the shore. Those who were unfortunately compelled to winter in the pack, obtained their supply from pools melted during the summer on the surface of the floe and refrozen. This, possibly, from the probable large admixture of land ice, both from glaciers and water-courses, and from the heavier falls of snow on the Smith's Sound route, may have given an absolutely pure water. Our experience has been different. I have failed to find any ice of any degree of thickness up to five feet, or ice from any pools found on the floe surface that would give a water absolutely free from salt. The snow-fall was not great, and as it was naturally very dry from the extreme cold, it was, of course, readily moved by the wind, and it took but a short time for it to become mingled with the loose granular ice on the surface of the floe. The wind, too, driving it with considerable force, may have caused the crystals to act as a sand-blast on the surface of the hummocks, and thus a mixture of snow and salt water ice made which contained a very large amount of salt. For some time we used water obtained from the ice of pools and from the snow, selecting it with care, and obtained a water that was potable, but not pure, and the use of which should not be long continued. Finally, we could not find it sufficiently pure to warrant its use, and we commenced to distill.

Dr. Kane says that "ice formed at a temperature of 30° Fahrenheit will yield a perfectly pure and potable element." Lieutenant Weyprecht says, that they found ice of a "certain thickness" to yield a pure water. Dr. Kane's statement and the opinions he expressed, are to the effect that the colder the temperature of the air at the time the ice is formed, the less salt will be contained in the ice. Dr. Saunderland of Parry's, and Dr. Walker of McClintock's expedition, express directly contrary views, and my experience leads me to coincide with them. . . . (Tabulated Experiments.) This is simply one of a number of instances which I think prove the fallacy of Dr. Kane's opinion that the colder the temperature the purer sea ice. . . . As to an absolutely pure ice being formed at a temperature of -30° Fahrenheit, I am fully convinced to the contrary, as I have been able to examine ice formed at various temperatures from +28.5° Fahrenheit to -50° Fahrenheit, and have failed to find any sea water ice absolutely free from salt. I have equally failed to find the statement of Lieutenant Weyprecht borne out by my experience. It is true that in thick ice you will find less salt in the deeper strata than in the upper, but this is due in a great measure to the fact that the freezing process necessarily goes on more slowly, as the upper strata of ice already formed is a poor conductor.

It may be that I have not had the opportunity of examining ice of the required thickness (Lieutenant Weyprecht does not state how thick), but from my present experience I should expect to find salt in any specimen of sea water ice from wherever obtained.

The following tabulated lists showing the result in a number of experiments noted at the time, and the conditions under which the ice was obtained, are not intended for comparison with each other, except in cases marked, but simply to show the result in the given case. For instance, in No. VIII. of the Table, ice formed at a temperature of -16.5° Fahrenheit, shows a much smaller amount of salt than *a.* of No. IX. Here the conditions under which they were frozen come into consideration. No. VIII. was taken from "Fire Hole" or surface of the sea, where there was a more or less free movement of the water, whereas No. IX. was frozen in a bucket, or rather tub, of a slightly conical shape (which is an important factor). And also a certain amount of efflorescence had taken place from No. VIII., and not from No. IX. To compare the results obtained from any two specimens you should know precisely all the conditions under which the ice was formed. In the two specimens given in No. IX. (*a.*, *b.*), I took equal quantities of water obtained at the same time and exposed for the

same length of time in similar vessels, but at different temperatures, collecting the ice from each, and examining it at the same time.

Number of Experiments.	Where obtained.	Thickness of ice.	Mean temperature at which frozen.	Specific gravity.	At a temperature Fahrenheit of	Chlorine per gallon estimated as sodium chloride.
		Inches.					Grains.
I.	Sea Water.			1.027	32°	2045
II.	Floe-piece thrown up by pressure, exposed to atmospheric changes for some time, and from which efflorescence had taken place.	45	- 17.3°			
	a. Water from upper 5 inches.			1.007	60°	548.06
	b. Water from lower 5 inches.			1.003	67°	347.25
III.	Water from ice of pool in old ice floe.					8.18
IV.	Water from mixed snow and surface ice.					28.43
V.	Water from melted efflorescence on young ice.					
VI.	Sea water exposed 19 hours in tub.					4253.6
	a. Water of entire thickness.	4½	- 24.2°	1.0175	51°	1349.7
	b. " " upper 2 inches.			1.019	48°	1922.3
	c. " " lower 2½ "					932.52
VII.	Ice remaining from No. VI collected, melted, and refrozen at a temperature above zero not precisely known.	1¼		1.0025	55°	143.15
VIII.	Water from ice formed in "Fire Hole."	2½	- 16.5°	1.016	35°	1096.12
IX.	Sea water, equal quantities, put in similar vessels, exposed for the same length of time at different temperatures.					
	a. Water exposed on deck.	3	- 6°	1.029	32°	2535.8
	b. " " in porch.	2	+ 5.6°	1.025	32°	1717.8
X.	Six inches of ice from which efflorescence had been removed.	6	- 39°	1.012	32°	797.1

1881,
March 7.

APPENDIX F. (See pages 509-512.)

Memoranda of Design for Construction and Fitting of a Vessel for Arctic Exploration.

BY GEORGE W. MELVILLE, CHIEF ENGINEER, U. S. N.

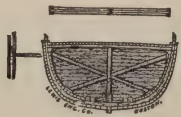
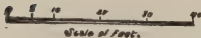
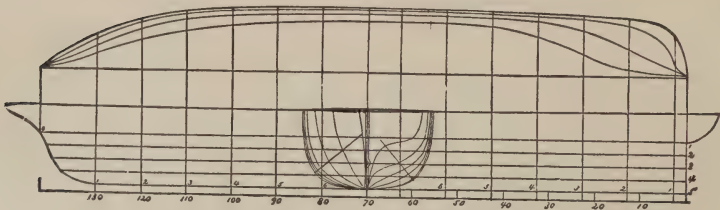
A SHIP for Arctic cruising should be as small as possible, and yet be able to carry her weight and billet her people with comfort. A light draft is desirable to enable her to clear unknown shoals in strange

waters, and to seek safety in shallow harbors out of the way of running ice. The "dead rise" should be made great, for it gives a vessel more of a tendency to rise when nipped or underrun by ice, thus exposing less of her body to the ramming and underriding of ice floes. A kettle-bottomed ship is to be avoided, for every consideration of safety. The only reason for building ships thus is because of their carrying capacity, — for their "great bowels," as the sailors say.

Great speed is not necessary in an Arctic ship; it would only result in her destruction if injudicious or accidental ramming should take place, although great power is requisite at times to enable her to force her way through ice obstructions. A coincidence has occurred in our last two American Arctic cruisers. The *Polaris* and *Jeannette* both had their "fore-foot" damaged, so as to cause continuous pumping while their crews remained with them, and in the end the *Jeannette* had her keel pushed right out of place, bursting open her garboard strakes, letting the water *up through her bottom*. Moral: Have neither keel or stem piece to expose to this danger. Have a false keel that will be *pushed off its place, not out of its place*, and fore-foot and wood ends enclosed or encased in iron sheathing around the bows, not on the surface of the water alone, but to go all the way down to and beyond the fore-foot, and clamp the whole together. Narrow bars of iron are a snare. The whole surface of the ship should be covered by one fourth inch sheeting of mild steel, for the following reasons: The ice of the Arctic Ocean is as hard as marble, and when the square edge of a floe-piece comes against the side of a wooden ship it does not glance off or slip by: it cuts and gouges in; the soft wood yields, and where an iron-sheathed ship would slip up out of the grasp of the ice like a greased pig from the hands of a clown, the unsheathed ship would be held fast and crushed. Again, if the frames and planking of an iron-sheathed ship were crushed, the sheathing would prevent the rapid inflow of water into the ship, after the manner of a sail as applied to a damaged ship's bottom. Pure air and freedom from dampness are as essential to the health and comfort of a ship's company as pure water and good food. This can only be accomplished by billeting every one above the spar deck, and having a condensing chamber surround the apartment of the people to collect the moisture. Heretofore, it was supposed that it would be too cold to quarter men above the spar deck, but in the *Jeannette* the driest and warmest place in the ship was in the trunk cabin above the spar deck, and the rudely made deck house forward was always comfortable in winter time. In this ship the men's quarters are in the centre of the ship, on the spar deck,

with a three-foot space all around it, and a low pilot house for the man at the wheel to stand inside the quarters and steer his trick at the wheel; another wheel being fitted aft for fine weather or sailing the ship by the wind.

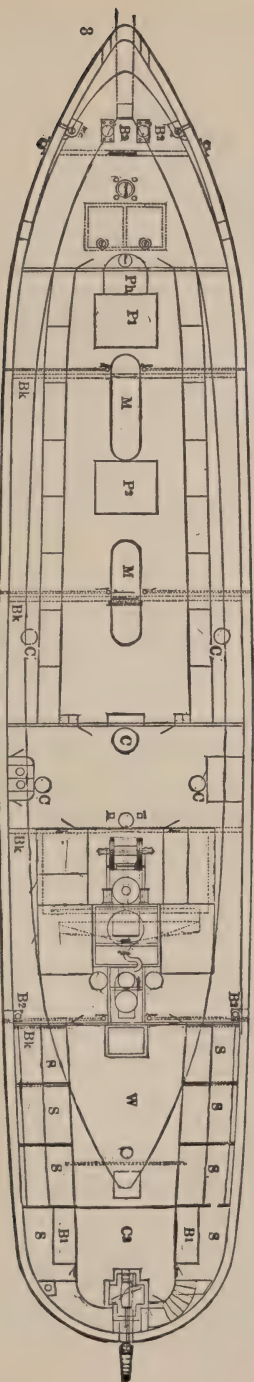
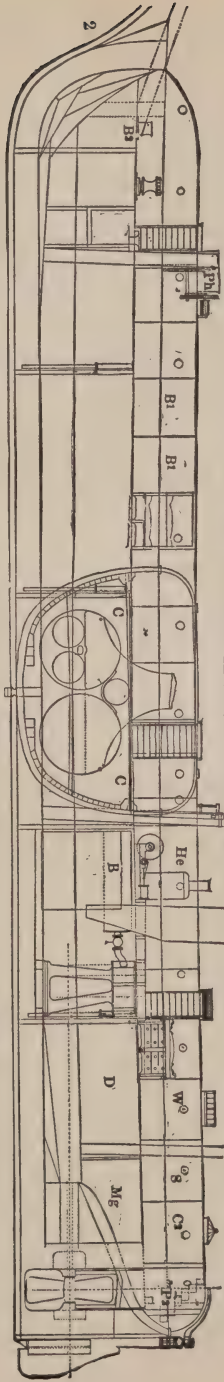
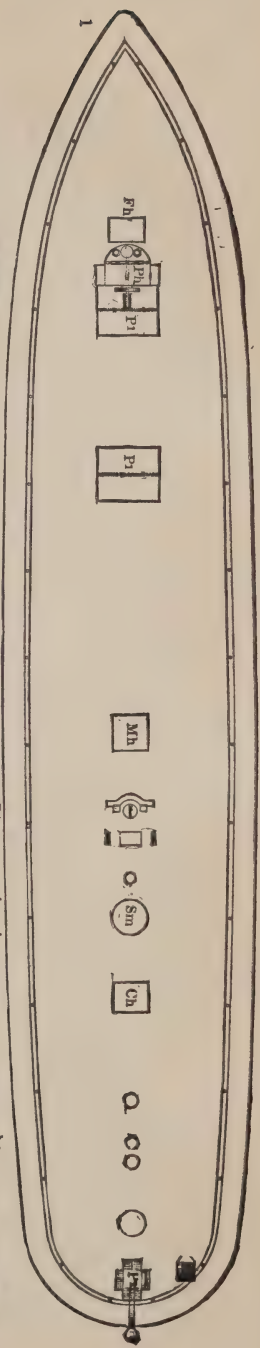
Economic systems of heating the ship and distilling water for potable purposes are requisite and necessary, and I have no hesitancy in saying that the freedom from scurvy enjoyed by the ship's company of the *Jeannette* was wholly due to the system of ventilation, the use of distilled water, and a liberal supply of food. For this purpose a heater and distiller are designed for cabin and forecabin, and the steam after heating the apartments is condensed and used for drinking purposes. A ship in the vicinity of glacier ice can dispense with the steam heater, and use the less expensive system of stoves for heating. To carry out these economic and sanitary arrangements a large supply of coal is necessary: the ship as designed can stow two hundred tons of coal. For ease and rapidity of working cargo an auxiliary boiler and engine is fitted, which can also be used for working ship, raising the propeller, receiving and discharging stores, unshipping the rudder in time of danger; and in case of the ship springing a leak the auxiliary engine can be used to work one or all six bilge pumps. Then these pumps are of the simplest and most efficient kind, and can be worked by hand while steam is being prepared. The bulkheads are fitted in such a manner that they cannot leak, the *inner and outer planking of the ship being fitted and caulked against a double frame*, and the bulkheads in turn fitted to inner skin of ship, as set forth in the drawings; so that the bulkheads, in addition to being as strong a truss as can be put in a ship, are watertight. No sluice valves are needed, although fitted as a pair of pumps that can be worked by hand or steam to each compartment. One peculiarity of the ship is that the rudder can be lifted at any time, even while the ship is under way, and can be used at any immersion from a foot of water near the surface all the way down to its full draft of water. There is no lock, and the rudder is outside of all parts of the ship, after the manner of a Dutch galliot, and is made to slide up or down a bobb iron in lieu of gudgeons and pintles. The iron plating is put on in a peculiar manner with wood screw bolts, the edges of the sheets being beveled, and the bolt holes placed and countersunk in such a manner as to give a clean, smooth surface to the ship's bottom and sides. The keel is fastened on outside of the plating, and in case of a great strain being brought on the keel it is pushed off and lost without material damage to the ship except sailing quality. A light house and deck



SHEAR. HALF-BREADTH,
AND BODY PLANS.
Showing arrangement of
bulkhead and water-stop
frames in wake of bulkhead.

A VESSEL DESIGNED FOR ARCTIC EXPLORATION.

Note. The designs for this vessel were the work of Chief-Engineer Melville in the last winter when the Jeannette was in the pack. He submitted them to Lieut.-Commander De Long, who gave them his approval. For description, see Appendix G.



SPAR DECK (1), BERTH DECK (2), HOLD PLAN (3).

- B, Boilers.
- B₁, Berths.
- B₂, Berths.
- B₃, Berths.
- Bk, Bulkheads.

- C, Coal.
- C₁, Cabins.
- Ch, Companion Hatch.
- D, Dry provisions.

- Fh, Fore Hatch.
- He, Hoisting Engine.
- M, Mess Tables.
- Mg, Magazine.

- Mh, Main Hatch.
- Ph, Pilot House.
- P₁, Provision Hatch.
- P₂, Propeller Well.

- S, Stowage Rooms.
- Sm, Smoke Pipe.
- W, Ward Room.

cover in such manner that all people are accommodated above the water line, and the whole of the bowels of the ship are given up to engine, coal, and stores; a fair division of the cabin space is allotted to each person, and the berths are made movable, so as to remove any ice that may form against the cold sides of the ship. Drying room, bath room, closets, instrument room, photographer's dark room, and dispensary are all in convenient position and roomy. Cook house for officers and crew, and pantries to suit, are all arranged on the spar deck. Provisions are stowed forward, coal amidship, clothing and fine stores aft. Compound engine and boilers of the most approved type to be fitted. General dimensions of ship from flank ends forward to forward rabbet of stern post 140 feet on water line, 38 feet beam, 12 feet draft. All of the foregoing requirements are fitted in the ship in question, and fully set forth in the drawings.

APPENDIX G. (*See page 657.*)

Some Remarks of Dr. Ambler on Snow Crystals, etc.

AFTER an experience of two seasons in the Arctic, I have no hesitation in saying that the variety of snow formations is as numerous, if not more so, than in more temperate climates. Without having made any special study of snow crystals I have been in the habit of observing them for years, and I can fairly presume that I am as familiar with the different formations as are most people. For some time past I have paid especial attention to the subject, and have found myself fully repaid for the trouble.

I will endeavor to give as clear a description as possible of what I have seen, and for the accuracy of which I will vouch; and will undertake to show any one accustomed to the use of a microscope. As for the deductions I make from the premises they must stand or fall on their own merits.

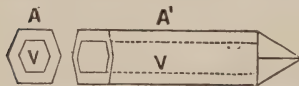
It is not necessary for me to point out the well-known utility of the hexagon in pattern drawing, but to the fact that water crystallizes in this system may be ascribed all the beauty and variety of the snow-flower.

The basic water crystal is the right hexagonal prism; the hexagonal pyramid occurs less frequently, the prism most often ending abruptly in an hexagonal plane, but sometimes being complimented by the adhesion of the pyramid. The length of the prism varies from

$\frac{1}{100}$ to $\frac{1}{50}$ of an inch, few being as large as the $\frac{1}{50}$, the breadth being as one to three.

The various forms and patterns of the snow-flower are due in great measure to the amount of saturation of the air stratum in which they are congealed. The more complete the saturation the larger and coarser the formation; the smaller the degree of relative humidity the finer and more beautiful the patterns. The so called "diamond dust" falling from a clear sky shows the prism in its most perfect condition; each little amorphous-looking mass is really made up of a number of crystals sometimes showing the most beautiful patterns, to which the large snow-flower, by comparison, is crude and rough.

The method of attachment between the crystals is usually butt to butt, and they do not often lie across one another. The adhesion between any two crystals of that character is called striction. Very small hexagonal scales under the microscope are seen to be built up of

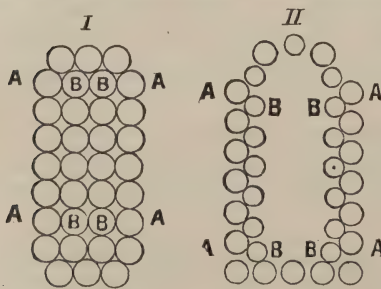


a number of what appear to be smaller hexagonal plates, but which are really the ends or butts of a number of hexagonal prisms which you are looking down upon, the thickness of the scale being the longitudinal diameter of the prisms.

Frequently you will be able to make out in the crystal (by proper manipulation of light) the vacua marked in the accompanying sketch, "A and A'," giving the two views.

I account for the formation of vacua in the following way: When the molecule (as I am inclined to think the molecular group which forms the practical working unit of water) loses heat the process is as follows:—

Let Fig. I. represent a section through the middle of the molecular group, and which simply for convenience we can conceive to be formed



of only two layers of molecules, A. and B. Now as the outer layer of molecules A. must necessarily lose heat sooner by radiation than the inner layer B., the temperature of any molecule A. will fall below the temperature of any molecule B. that lies within. As soon, however, as this occurs, molecule B. will give

up some of the excess of heat to A., which will again radiate it; and so on, until B. gives up all of its heat, A. receiving the last unit, and

then B. freezes while A. radiates this last unit into space. This process, of course, goes on through the whole group.

While this loss of temperature is going on there is an accompanying change taking place. The molecules A. and B. (B. more rapidly than A.), in obedience to the universal law of nature, are contracting upon themselves, and B., moreover, in obedience to another and invariable law, is contracting and crystallizing in the direction of A., the surface through which it loses heat. And hence we find the two rows of molecules B., which in Fig. I. touched each other in the centre of the group, are in Fig. II. drawing away from each other, and are concentrating and crystallizing in and between molecules A. Molecules A., being still liquid or plastic, yield to the pressure, and allow a different molecular grouping; so that, although they themselves have obeyed the same invariable law, yet the difference of time at which they have done so has allowed a sufficient number of the molecules B. to be thrust between them, and thus more than make up for their own contraction, and hence the resultant ice-crystal will present a greater superficies than the molecular group of H₂O, from which it was formerly, and should naturally present a vacuum in its centre.

As an example of the increase of superficial surface by an alteration of the molecular arrangement, we have only to refer to the common soap bubble. Of course no similarity of production is implied, but the result is the same in a degree.

So it follows that, if the reasoning is true, the so-called "expansion of ice" cannot be looked upon as a special providence for the little fishes, but must be regarded as another manifestation of the invariable and immutable course of Nature's law.

April 1st, 1881.

APPENDIX H. (See page 682.)

TIDE MEASUREMENTS MADE AT BENNETT ISLAND,

July, August, 1881.

	A. M.	Feet. Inches.	A. M.	Feet. Inches.
July 30,	10.26	1 2 $\frac{1}{4}$	3.26	0 9
	11.26	0 8 $\frac{1}{2}$	4.26	1 4
	P. M.		5.26	1 11 $\frac{1}{4}$
	12.26	0 4 $\frac{3}{4}$	6.26	2 5 $\frac{1}{4}$
	1.26	0 3 $\frac{1}{2}$	7.26	2 8
	2.26	0 5	8.26	2 6 $\frac{1}{2}$ ¹

¹ Rise of 2 feet, 4 $\frac{1}{2}$ inches.

	A. M.		Feet.	Inches.
	9.26	. . . . .	1	10 $\frac{1}{2}$
	10.26	. . . . .	1	5
	11.26	. . . . .	1	0 $\frac{1}{2}$
July 31,	A. M.			
	12.26	. . . . .	0	7 $\frac{1}{4}$
	1.26	. . . . .	0	5 $\frac{1}{2}$ ²
	2.26	. . . . .	0	5 $\frac{3}{4}$
	3.26	. . . . .	0	10
	4.26	. . . . .	1	4 $\frac{1}{2}$
	5.26	. . . . .	1	11
	6.26	. . . . .	2	5 $\frac{1}{2}$
	7.26	. . . . .	2	8 $\frac{1}{2}$
	8.11	(H. w.)	2	9 ⁸
	8.26	. . . . .	2	8
	9.26	. . . . .	2	4 $\frac{3}{4}$
	10.26	. . . . .	1	10 $\frac{1}{2}$
	11.26	. . . . .	1	7 $\frac{1}{2}$
	P. M.			
	12.26	. . . . .	0	10 $\frac{1}{4}$
	1.26	. . . . .	0	7 $\frac{1}{2}$
	2.11	(L. w.)	0	7 $\frac{1}{4}$
	2.26	. . . . .	0	8
	3.26	. . . . .	0	9 $\frac{1}{2}$
	4.26	. . . . .	1	3
	5.26	. . . . .	1	10
	6.26	. . . . .	2	5 $\frac{1}{2}$
	7.26	. . . . .	2	9
	7.56	(H. w.)	2	10
	8.26	. . . . .	2	9 $\frac{1}{2}$
	9.26	. . . . .	2	5 $\frac{3}{4}$
	10.26	. . . . .	1	11 $\frac{1}{2}$
	11.26	. . . . .	1	5
Aug. 1,	A. M.			
	12.26	. . . . .	0	11 $\frac{1}{4}$
	1.26	. . . . .	0	7 $\frac{1}{2}$
	1.54	(L. w.)	0	7
	2.26	. . . . .	0	7 $\frac{1}{8}$
	3.01	. . . . .	0	7
	3.21	. . . . .	0	9 $\frac{1}{2}$
	4.26	. . . . .	1	2 $\frac{3}{4}$
	5.26	. . . . .	1	9
	6.26	. . . . .	2	2
	7.26	. . . . .	2	8 $\frac{1}{2}$
	8.04	(H. w.)	2	9 $\frac{3}{4}$
	8.26	. . . . .	2	9 $\frac{1}{2}$
	9.26	. . . . .	2	7 $\frac{3}{4}$
	10.26	. . . . .	2	2
	11.26	. . . . .	1	8 $\frac{1}{2}$

² Fall of 2 feet, 2 $\frac{1}{4}$ inches.

	P. M.		Feet.	Inches.
	12.26	. . . . .	1	11 $\frac{1}{2}$
	1.26	. . . . .	0	8
	2.26	(L. w.)	0	7
	3.26	. . . . .	0	10
	4.26	. . . . .	1	2
	5.26	. . . . .	1	8 $\frac{1}{2}$
	6.26	. . . . .	2	2 $\frac{3}{4}$
	7.26	. . . . .	2	8 $\frac{1}{4}$
	8.26	(H. w.)	2	11
	9.26	. . . . .	2	9
	10.26	. . . . .	2	4
	11.26	. . . . .	1	9 $\frac{1}{2}$
Aug. 2,	A. M.			
	12.26	. . . . .	1	31 $\frac{1}{2}$
	1.26	. . . . .	0	11
	2.26	. . . . .	0	9 $\frac{3}{4}$
	2.42	(L. w.)	0	9 $\frac{3}{4}$
	3.26	. . . . .	0	10
	4.26	. . . . .	1	2
	5.26	. . . . .	1	8
	6.26	. . . . .	2	2 $\frac{1}{4}$
	7.26	. . . . .	2	8 $\frac{1}{4}$
	8.26	(H. w.)	2	11 $\frac{7}{8}$
	9.26	. . . . .	2	10 $\frac{7}{8}$
	10.26	. . . . .	2	7 $\frac{3}{4}$
	11.26	. . . . .	2	2 $\frac{3}{4}$
	P. M.			
	12.26	. . . . .	1	8 $\frac{1}{2}$
	1.26	. . . . .	1	2
	2.26	. . . . .	1	0 $\frac{1}{2}$
	2.56	(L. w.)	0	11 $\frac{1}{4}$
	3.26	. . . . .	0	11 $\frac{1}{2}$
	4.26	. . . . .	1	1 $\frac{3}{4}$
	5.26	. . . . .	1	6
	6.26	. . . . .	2	0 $\frac{1}{2}$
	7.26	. . . . .	2	6 $\frac{1}{4}$
	8.26	. . . . .	2	10
	9.16	(H. w.)	2	11 $\frac{1}{4}$
	9.26	. . . . .	2	11
	10.26	. . . . .	2	8 $\frac{1}{2}$
	11.26	. . . . .	2	3 $\frac{1}{4}$
Aug. 3,	A. M.			
	12.26	. . . . .	1	10 $\frac{1}{4}$
	1.26	. . . . .	1	5 $\frac{1}{4}$
	2.26	. . . . .	1	1
	3.16	(L. w.)	1	0 $\frac{1}{4}$
	3.26	. . . . .	1	0 $\frac{1}{2}$
	4.26	. . . . .	1	3
	5.26	. . . . .	1	7

³ Rise of 2 feet, 3 $\frac{1}{2}$ inches.

A. M.		F.	I.	P. M.		F.	I.
		feet.	inches.			feet.	inches.
6.26	. . . . .	2	0 $\frac{1}{4}$	9.26	. . . . .	2	9 $\frac{1}{2}$
7.26	. . . . .	2	6 $\frac{1}{4}$	10.26	. (H. W.)	2	10
8.26	. . . . .	2	11 $\frac{1}{4}$	11.26	. . . . .	2	9
9.13	. (H. W.)	3	1	A. M.			
9.26	. . . . .	3	0 $\frac{3}{4}$	Aug. 5, 12.26	. . . . .	2	6
10.26	. . . . .	2	10 $\frac{3}{4}$	1.26	. . . . .	2	11 $\frac{1}{4}$
11.26	. . . . .	2	6 $\frac{1}{2}$	2.26	. . . . .	1	9 $\frac{1}{4}$
P. M.				3.26	. . . . .	1	6 $\frac{1}{4}$
12.26	. . . . .	2	1 $\frac{3}{4}$	4.26	. (L. W.)	1	4 $\frac{1}{2}$
1.26	. . . . .	1	8 $\frac{1}{2}$	5.26	. . . . .	1	6 $\frac{3}{4}$
2.26	. . . . .	1	4	6.26	. . . . .	1	9
3.26	. . . . .	1	2 $\frac{1}{8}$	7.26	. . . . .	2	0 $\frac{1}{2}$
3.41	. (L. W.)	1	2	8.26	. . . . .	2	5
4.26	. . . . .	1	2 $\frac{7}{8}$	9.26	. . . . .	2	8 $\frac{1}{2}$
5.26	. . . . .	1	5 $\frac{1}{4}$	10.26	. . . . .	2	11 $\frac{1}{4}$
6.26	. . . . .	1	10 $\frac{1}{2}$	11.6	. (H. W.)	3	0
7.26	. . . . .	2	3 $\frac{1}{2}$	11.26	. . . . .	2	11 $\frac{1}{2}$
8.26	. . . . .	2	8	P. M.			
9.26	. . . . .	2	11	12.26	. . . . .	2	9
10.26	. (H. W.)	2	11 $\frac{3}{4}$	1.26	. . . . .	2	5 $\frac{1}{2}$
11.26	. . . . .	2	8 $\frac{1}{4}$	2.26	. . . . .	2	11 $\frac{1}{2}$
A. M.				3.26	. . . . .	1	9
Aug. 4, 12.26	. . . . .	2	4 $\frac{1}{4}$	4.26	. . . . .	1	6 $\frac{1}{2}$
1.26	. . . . .	1	10 $\frac{1}{2}$	4.56	. (L. W.)	1	6
2.26	. . . . .	1	7 $\frac{1}{2}$	5.26	. . . . .	1	6 $\frac{3}{4}$
3.26	. . . . .	1	4 $\frac{1}{2}$	6.26	. . . . .	1	7
3.56	. (L. W.)	1	3 $\frac{3}{4}$	7.26	. . . . .	1	9
4.26	. . . . .	1	4	8.26	. . . . .	2	11 $\frac{1}{4}$
5.26	. . . . .	1	6 $\frac{1}{2}$	9.26	. . . . .	2	4 $\frac{1}{2}$
6.26	. . . . .	1	10 $\frac{1}{2}$	10.26	. . . . .	2	7
7.26	. . . . .	2	3 $\frac{1}{4}$	11.26	. . . . .	2	8 $\frac{1}{2}$
8.26	. . . . .	2	8 $\frac{1}{2}$	11.56	. (H. W.)	2	9
9.26	. . . . .	2	11 $\frac{1}{2}$	A. M.			
10.26	. (H. W.)	3	0 $\frac{3}{4}$	Aug. 6, 12.26	. . . . .	2	8 $\frac{3}{4}$
11.26	. . . . .	2	11	1.26	. . . . .	2	5 $\frac{1}{2}$
P. M.				2.26	. . . . .	2	2
12.26	. . . . .	2	6	3.26	. . . . .	1	11
1.26	. . . . .	2	1	4.26	. . . . .	1	9
2.26	. . . . .	1	9 $\frac{1}{2}$	5.26	. (L. W.)	1	8 $\frac{1}{4}$
3.26	. . . . .	1	6	6.26	. . . . .	1	9
4.26	. (L. W.)	1	4 $\frac{3}{4}$	7.26	. . . . .	1	11
5.26	. . . . .	1	5 $\frac{3}{4}$	8.26	. . . . .	2	2
6.26	. . . . .	1	8 $\frac{1}{2}$	9.26	. . . . .	2	6 $\frac{1}{2}$
7.26	. . . . .	2	0 $\frac{1}{4}$	10.26	. . . . .	2	9 $\frac{3}{4}$
8.26	. . . . .	2	5 $\frac{1}{2}$	11.26	. (H. W.)	3	1 $\frac{1}{4}$

⁴ 0 mark = 0 feet, 5 $\frac{1}{2}$ inches of scale very nearly.

Tidal observations cease. Last man left island about one P. M.

APPENDIX I.

Report of the Court of Inquiry convened at the Navy Department, Washington, D. C., by Virtue of an Order signed by the Hon. William E. Chandler, Secretary of the Navy, to Investigate the Circumstances of the Loss of the Exploring Steamer Jeannette.

Commodore WILLIAM G. TEMPLE, United States Navy, president ; Master SAMUEL C. LEMLY, United States Navy, judge-advocate.

February 12, 1883.

IN conformity with a joint resolution of the Congress, approved August 8, 1882, and in compliance with the orders of the honorable Secretary of the Navy, dated September 29, 1882, the court of inquiry has diligently and thoroughly investigated —

The circumstances of the loss in the Arctic seas of the exploring steamer Jeannette, and of the death of Lieut.-Commander George W. De Long, and others of her officers and men.

The court has also carefully inquired —

Into the condition of the vessel on her departure, her management up to the time of her destruction, the provisions made and plans adopted for the several boats' crews in their leaving the wreck, the efforts made by the various officers to insure the safety of the parties under their immediate charge, and for the relief of the other parties, and into the general conduct and merits of each and all the officers and men of the expedition.

And the court transmits herewith its proceedings, the testimony taken, and after mature deliberation reports that the following facts are deemed established by the evidence adduced:—

First. As to "the condition of the vessel on her departure."

The Jeannette was originally her Britannic Majesty's ship Pandora, and was purchased from the British government in April, 1875, by Sir Allen W. Young, who made two voyages in her to the Arctic regions, and who finally sold her to Mr. James Gordon Bennett in 1877.

By an act of Congress approved February 27, 1879, she was accepted under certain conditions by the United States government for the purpose of making further explorations in the Arctic regions, and although the weight of the evidence shows that she was not especially adapted in strength or model for that kind of navigation, the fact that an experienced Arctic explorer had voluntarily made two cruises in her to the Arctic seas sustains the judgment and care shown in her selection when last purchased.

The vessel was strengthened as much as practicable at the navy-yard,

Mare Island, California, and such other additions and improvements were made as were recommended by her commanding officer; and the condition of the *Jeannette* on her departure from the port of San Francisco was good, and satisfactory to her officers and crew, except that she was unavoidably deeply loaded, a defect which corrected itself by the consumption of coal, provisions, and stores.

Second. As to "her management up to the time of her loss."

The lateness of the season when the *Jeannette* sailed from San Francisco, her want of speed, and the delay occasioned by her search along the Siberian coast, under orders from the Navy Department, for the Swedish exploring steamer *Vega*, placed the commander at a great disadvantage on his meeting with the pack ice early in September, in the vicinity of Herald Island. Either he had to return to some port to the southward, and pass the winter there in idleness, thus sacrificing all chance of pushing his researches to the northward until the following summer, or else he must endeavor to force the vessel through to Wrangel Island, then erroneously supposed to be a large continent, to winter there, and prosecute his explorations by sledges. The chances of accomplishing this latter alternative were sufficiently good at the time to justify him in choosing it; and, indeed, had he done otherwise, he might fairly have been thought wanting in the high qualities necessary for an explorer.

This attempt unfortunately resulted in the vessel's becoming beset in the ice pack within less than two months after her departure from San Francisco, from which she was never released until her destruction, more than twenty-one months later.

During these weary months of forced inaction the vessel and her people were at times threatened with great dangers. Especially was her destruction imminent on January 19, 1880, when she sprung a leak from ice pressures, and for months after that date she was kept afloat only by skillful devices and arduous labor.

It may be here mentioned that throughout the expedition every opportunity was improved for gaining scientific information. Meteorological and astronomical observations, temperature and density of the sea water, and soundings were taken and preserved; studies of the character and action of the ice were noted; specimens of the bottom and of such fauna and flora as could be procured were examined. Three islands were discovered, two of which were visited, explored, and taken possession of in the name of the United States.

The arrangements to abandon ship at a moment's warning, and to guard against fire, were all that could be desired, and the evidence

shows that in the management of the *Jeannette* up to the time of her destruction Lieutenant-Commander De Long, by his foresight and prudence, provided measures to meet emergencies, and enforced wise regulations to maintain discipline, to preserve health, and to encourage cheerfulness among those under his command; and the physical condition of the people was good, with the exception of a few cases of lead-poisoning, the result of eating canned provisions. The fact of the ship's having passed a second winter in the pack without any appearance of scurvy on board sufficiently attests the excellence of the sanitary arrangements adopted, and reflects great credit upon her medical officer, Passed Assistant Surgeon James M. Ambler, who throughout the expedition was indefatigable in the performance of his duties.

Third. As to the circumstances of the loss in the Arctic seas of the exploring steamer *Jeannette*.

The *Jeannette* was sunk on June 13, 1881, from being crushed by the ice in latitude $77^{\circ} 15'$ north; longitude $155^{\circ} 50'$ east, after drifting uncontrollably in the pack ice since September 6, 1879. Any vessel in like position, no matter what her model might have been, or however strongly constructed, and subjected to the same pressures as those incurred by the *Jeannette*, would have been annihilated.

She was abandoned in a cool and orderly manner on the evening of June 12, and foundered about 4 A. M. the day following, and the court attaches no blame to any officer or man for her loss.

Fourth. As to "the provisions made and plans adopted for the several boats' crews upon their leaving the wreck."

The contingency of the loss of the vessel had been foreseen and provided for, and when the emergency arose, everything was prepared to meet it.

The officers and men were divided into three parties and assigned to the boats best fitted for the anticipated work; boat and provision-sledges had been provided, and more boats, clothing, provisions, and stores were removed from the vessel than could be transported on the retreat.

The party being thus thrown upon the ice, five days were passed in arranging for the long journey to the land, and the provisions made and plans adopted for the several boats' crews upon their leaving the wreck were judicious, as the evidence shows that ninety days after the destruction of the *Jeannette* the officers and men were in fair condition, notwithstanding their terrible journey.

Fifth. As to "the efforts made by the various officers to insure the safety of the parties under their immediate charge, and for the relief of the other parties."

The retreat commenced on the 18th of June; and during the ensuing three months the entire ship's company remained together, under the direction of the commander, struggling against obstacles which required indomitable pluck and perseverance to overcome — compelled to drag their heavy boats and loads of provisions over broken and shifting fields of ice, at times ferrying them over the water-spaces, and often carried far out of their course by the drift of the pack, delayed by storms, fogs, and snows; there seems to have been no precaution neglected which would tend to insure their safety. During this time, as well as upon other occasions, the conduct of Ice Pilot Dunbar, Boatswain Cole, and Fireman Bartlett elicited well-deserved commendations.

The original plan of retreat was to make a southerly course, presumably, to reach the open water as soon as possible, and thence by way of the New Siberian Islands to the delta of the Lena, the nearest point at which it was supposed that relief could be obtained. But the commander found after a time, by observation, that the current was sweeping them so rapidly to the northward and westward that their labor was almost in vain, and that the course made good was but little to the southward of west. He wisely refrained from discouraging the party by announcing this fact, and changed his course so as to cross this current at right angles, and get beyond its influence as soon as practicable.

After twenty-three days of toil and anxiety, Bennett Island was discovered, where they landed, and occupied eight days in resting and making necessary repairs to boats. In trying to reach this island the party suffered many disappointments and encountered unexpected dangers, difficulties, and delays in overcoming a very short distance, owing to the swift currents and rapid movements of the broken ice close to the shore.

A further delay, from August 19 to August 29, was afterwards forced upon the party by the condition of the ice, which rendered progress impossible. Meantime it had been deemed expedient at Bennett Island, in order to save food for the men, that about half of the dogs should be killed, as they were no longer needed to drag the sleds, and it was considered inhuman to leave them there to starve, and afterwards all but two of them escaped on the ice; but still it was found necessary to reduce the allowance of provisions from time to time during the remainder of the journey.

On the 12th of September the three boats were separated in a gale of wind when approaching the Siberian coast, at an estimated distance of about ninety miles to the northward and eastward of the Lena Delta, and no further record exists of the second cutter's party; but as Lieu-

tenant Chipp, who was in charge of her, was noted for his seamanlike qualities, it may safely be assumed that he did all that a brave and capable man could do to weather the gale.

The first cutter and whale-boat, under the command respectively of Lieutenant-Commander De Long and Chief-Engineer Melville, barely managed to live through the gale by riding to sea-anchors, and in rounding to, the first cutter carried away the step of her mast, and the next day lost her sail, which formed a portion of her drag. During the gale the professional services of Lieutenant Danenhower, who was on the sick list, were called into requisition, and he is deserving of credit for the skill with which he managed the whaleboat, as well as for her subsequent navigation to the land.

When the weather moderated, both boats endeavored to reach Cape Barkin, the northeast point of the Lena Delta, upon which the charts erroneously indicated winter huts and inhabitants.

The whaleboat, with eleven people on board, on striking shoal water out of sight of land, stood to the eastward, and hauling in for the land the next day, she was fortunate enough, on September 16, to enter one of the eastern mouths of the Lena River, and three days afterwards fell in with natives, who guided them to the village of Geeomovialocke, where they arrived on the 25th, and subsisted until they were able to communicate with the commandant of Bulun.

In the mean time, the first cutter, with fourteen persons in all, had made the best of her way under a jury mast and sail towards the land; but encountering young ice and shoal water, the party, on the 17th of September, was forced to abandon the boat a mile and a half from the beach, and to wade ashore through the ice and mud, carrying the few remaining stores and provisions on their backs. They had the misfortune to land at the mouth of one of the northern outlets of the Lena River, where no inhabitants were to be found, although a considerable village, not indicated on their charts, and consequently unsuspected by them, lay some twenty-five miles to the westward.

They had landed frost-bitten and exhausted, with only a few days' provisions, which were eked out by a meagre supply of game. They began their painful journey to the southward, hampered in their movements by those who were disabled, but encouraged from time to time by traces of frequent occupancy in the huts, and footprints about the fox-traps which they encountered on the way, and they struggled on manfully, misled by their imperfect map of the country, and always imagining themselves near a place of refuge, until toward the end of October, when, after eating their remaining dog, they perished from hun-

ger and cold, all but two — Seamen Nindemann and Noros, whom the commander had previously sent on in advance for assistance, and who, after great hardships, were found and rescued by the natives. These two men did their utmost to make the natives understand the condition of the commander's party, and to induce them to go to its relief, but without success. It seems that there was some confusion in the minds of these people between the commander's party and that under Mr. Melville at Geomovialocke, but the two seamen knew nothing of the whaleboat's fate, and could not therefore guess at the mistake; nor is it probable that if they had returned they would have found any of the commander's party alive.

Meanwhile the whaleboat's party remained five weeks at Geomovialocke, living upon the limited hospitality of a few poor natives, who saw their winter supplies rapidly disappearing before the hunger of this large party. They, like the first cutter's crew, had landed frost-bitten and exhausted, and being ill-fed, and badly clothed and lodged, they were many days in regaining their strength.

Efforts were made from the first, but without avail, to get transportation for the party to a place of permanent safety, and also to institute a search for the other parties, which nevertheless they believed to have been lost in the gale.

Lieutenant Danenhower started on the 17th of October, with a dog team, to explore the coast for the missing boats, but was unable, from the condition of the ice, to proceed far in any direction, and returned without results. The wide river, or rather bay, which separated Geomovialocke from the mainland, was sometimes covered with young ice, too thick for the passage of boats, and too thin for the passage of sledges, and at times was filled with floating masses of old ice; while their ignorance of the language left them unable to express their wants, or to discover the resources of the vicinity in respect to reindeer or dog teams.

It was not until October 29 that Chief-Engineer Melville learned that the first cutter had survived the gale, when he at once started, and, meeting and consulting with Seamen Nindemann and Noros, did all in his power to find and succor his missing comrades. He succeeded in recovering a portion of the records left behind by the commander, but after nearly sacrificing his life from hunger and cold, and feeling assured that the remainder of the first cutter's party had undoubtedly perished, he returned southward to Bulun, and then went to Yakutsk, where he at once commenced preparations for a more extended search when the season would permit, in the mean time forwarding to Irkutsk the members of his party not needed or unfitted for the search.

On March 12, Chief-Engineer Melville was enabled to assemble the relief party at Kas-Karta, the appointed rendezvous, when the search for the first cutter's crew was commenced, and resulted in finding, between March 23 and 27, the remainder of the records, and the bodies of Lieutenant-Commander De Long's party, except those of Ericksen and Alexey, which had been buried in the river.

The bodies were removed and properly interred on high land near Mat-Vai, safe from the effects of the spring floods.

After this had been done, three parties were formed under the charge of Chief-Engineer Melville, Seaman Nindemann, and Fireman Bartlett, respectively, and the coasts and upper portion of the Lena Delta were thoroughly searched for the second cutter's party, but without finding any traces of it. The search was continued as far as the river Jana, and as by this time the sledging season was at an end, the parties returned to Yakutsk, when Chief-Engineer Melville, with all but five of his men, proceeded home by order of the Navy Department. These five remained with Lieutenant Harber, who had been sent to aid in the search.

Considering, then, the condition of the survivors, the unfavorable season, the limited knowledge of the country, the want of facilities for prosecuting the search, and the great difficulty of communicating with the natives, everything possible was done for the relief of the other parties.

The following is a list of the officers and crew of the *Jeannette*, showing their assignment to the boats on the retreat, and their final fate or disposition:—

FIRST CUTTER (XIV).

Lieutenant-Commander George W. De Long, United States Navy, commanding. Died in the Lena Delta.

Passed Assistant Surgeon James M. Ambler, United States Navy. Died in the Lena Delta.

Mr. Jerome J. Collins (meteorologist). Died in the Lena Delta.

Seaman W. F. C. Nindemann. Sent ahead for relief and rescued by natives; a witness before the court.

Seaman Louis P. Noros. Sent ahead for relief and rescued by natives; a witness before the court.

Seaman Heinrich H. Kaack. Died in the Lena Delta.

Seaman Carl A. Görtz. Died in the Lena Delta.

Seaman Adolph Dressler. Died in the Lena Delta.

Coppersmith Walter Lee. Died in the Lena Delta.

Seaman Hans H. Ericksen. Died in the Lena Delta.

Coalheaver Nelse Iversen. Died in the Lena Delta.
 Coalheaver George W. Boyd. Died in the Lena Delta.
 Seaman Ah Sam. Died in the Lena Delta.
 Seaman Alexey (dog-driver and hunter). Died in the Lena Delta.

SECOND CUTTER (VIII).

Lieut. Charles W. Chipp, United States Navy, commanding.
 Seaman William Dunbar (ice pilot).
 Seaman Alfred Sweetman.
 Seaman Henry D. Warren.
 Seaman Peter E. Johnson.
 Seaman Edward Starr.
 Seaman Albert G. Kuehne.
 Coalheaver Walter Sharvell.
 Of which boat, with her crew, no record exists subsequent to the gale of September 12, 1881.

WHALEBOAT (XI).

Chief-Engineer George W. Melville, United States Navy, commanding. Rescued by natives; a witness before the court.
 Lieutenant John W. Danenhower, United States Navy. Rescued by natives; a witness before the court.
 Mr. Raymond L. Newcomb (naturalist and taxidermist). Rescued by natives; a witness before the court.
 Seaman John Cole (boatswain). Rescued by natives; now an inmate of the Government Insane Asylum.
 Fireman James H. Bartlett. Rescued by natives; retained in Siberia to assist Lieutenant Harber.
 Seaman Herbert W. Leach. Rescued by natives; retained in Siberia to assist Lieutenant Harber.
 Seaman Henry Wilson. Rescued by natives; a witness before the court.
 Seaman Frank E. Manson. Rescued by natives; retained in Siberia to assist Lieutenant Harber.
 Seaman Charles Tong Sing. Rescued by natives; a witness before the court.
 Coalheaver John Lauterbach. Rescued by natives; retained in Siberia to assist Lieutenant Harber.
 Seaman Aneguin (dog-driver and hunter). Rescued by natives; retained in Siberia to assist Lieutenant Harber; subsequently died at Kirinsk.

Sixth. As to "the general conduct and merits of each and all the officers and men of the expedition."

There is conclusive evidence that aside from trivial difficulties, such as occur on shipboard even under the most favorable circumstances, and which had no influence in bringing about the disasters of the expedition, and no pernicious effect upon its general conduct, every officer and man so conducted himself that the court finds no occasion to impute censure to any member of the party.

In view, then, of the long and dreary monotony of the cruise, the labors and privations encountered, the disappointment consequent upon a want of important results, and the uncertainty of their fate (and apart from a natural desire to tread lightly on the graves of the dead), the general conduct of the *personnel* of the expedition seems to have been a marvel of cheerfulness, good-fellowship, and mutual forbearance, while the constancy and endurance with which they met the hardships and dangers that beset them entitle them to great praise.

Besides the mention already made, however, special commendation is due to Lieutenant-Commander De Long for the high qualities displayed by him in the conduct of the expedition; to Chief-Engineer Melville, for his zeal, energy, and professional aptitude, which elicited high encomiums from his commander, and for his subsequent efforts on the *Lena Delta*; and to Seamen Nindemann and Sweetman, for services which induced their commander to recommend them for medals of honor.

Finally, it should be stated that there are several of the survivors of the *Jeannette* who have not yet returned from Siberia, and whose testimony might or might not modify the conclusions set forth in this report.

WM. G. TEMPLE,

Commodore, United States Navy, president.

SAM. C. LEMLY,

Master, United States Navy, judge-advocate.

And the doors having been reopened, the court then, at 4 P. M., adjourned to await the further orders of the honorable Secretary of the Navy.

WM. G. TEMPLE,

Commodore, United States Navy, president.

SAM. C. LEMLY,

Master United States Navy, judge-advocate.

NAVY DEPARTMENT,
OFFICE OF THE JUDGE-ADVOCATE-GENERAL,

February 17, 1883.

Respectfully submitted, with the recommendation that the finding of the court be approved.

WM. B. REMEY,
Judge-advocate-general.

NAVY DEPARTMENT, *February 17, 1883.*

The finding of the court is approved.

WM. E. CHANDLER,
Secretary of the Navy.

EIGHTY-FIFTH DAY.

NAVY DEPARTMENT,

Washington, D. C., Saturday, April 7, 1883 — 10.30 A. M.

The court met pursuant to the adjournment of yesterday.

Present, Commodore William G. Temple, United States Navy, president; Commander Frederick V. McNair, United States Navy, member; and Lieutenant Richard Wainwright, United States Navy, judge-advocate.

The record of the proceedings of Friday, April 6, 1883, the eighty-fourth day of the inquiry, was then read, and, after correcting clerical errors, was approved.

The court was then cleared for deliberation, and agreed upon the following report:—

In obedience to the order of the honorable Secretary of the Navy, dated March 29, 1883, the court of inquiry of which Commodore William G. Temple, United States Navy, is president, reassembled at the Navy Department, at 12 o'clock M. on Friday, the 30th instant, for the purpose of completing the investigation of circumstances of the loss in the Arctic seas of the exploring steamer *Jeannette*, and the death of Lieutenant-Commander De Long and others of the officers and men, &c.

Having concluded the examination of the survivors of that vessel who have recently returned from Siberia, the court have the honor herewith to report its further proceedings, with the testimony, and, after mature consideration of the evidence adduced, find that no modification is requisite in their conclusions reported February 12, 1883.

WILLIAM G. TEMPLE,
Commodore, United States Navy, president.

RICHARD WAINWRIGHT,
Lieutenant, United States Navy, judge-advocate.

And the doors being reopened, the court then, at 11.50 A. M., adjourned to await the further orders of the honorable Secretary of the Navy.

WILLIAM G. TEMPLE,

Commodore, United States Navy, president.

RICHARD WAINWRIGHT,

Lieutenant, United States Navy, judge-advocate.

NAVY DEPARTMENT,

OFFICE OF THE JUDGE-ADVOCATE-GENERAL,

April 23, 1883.

Respectfully submitted, with the recommendation that the finding of the court be approved.

WM. B. REMEY,

Judge-advocate-general.

NAVY DEPARTMENT, *April 23, 1883.*

The finding of the court is approved.

WM. E. CHANDLER,

Secretary of the Navy.

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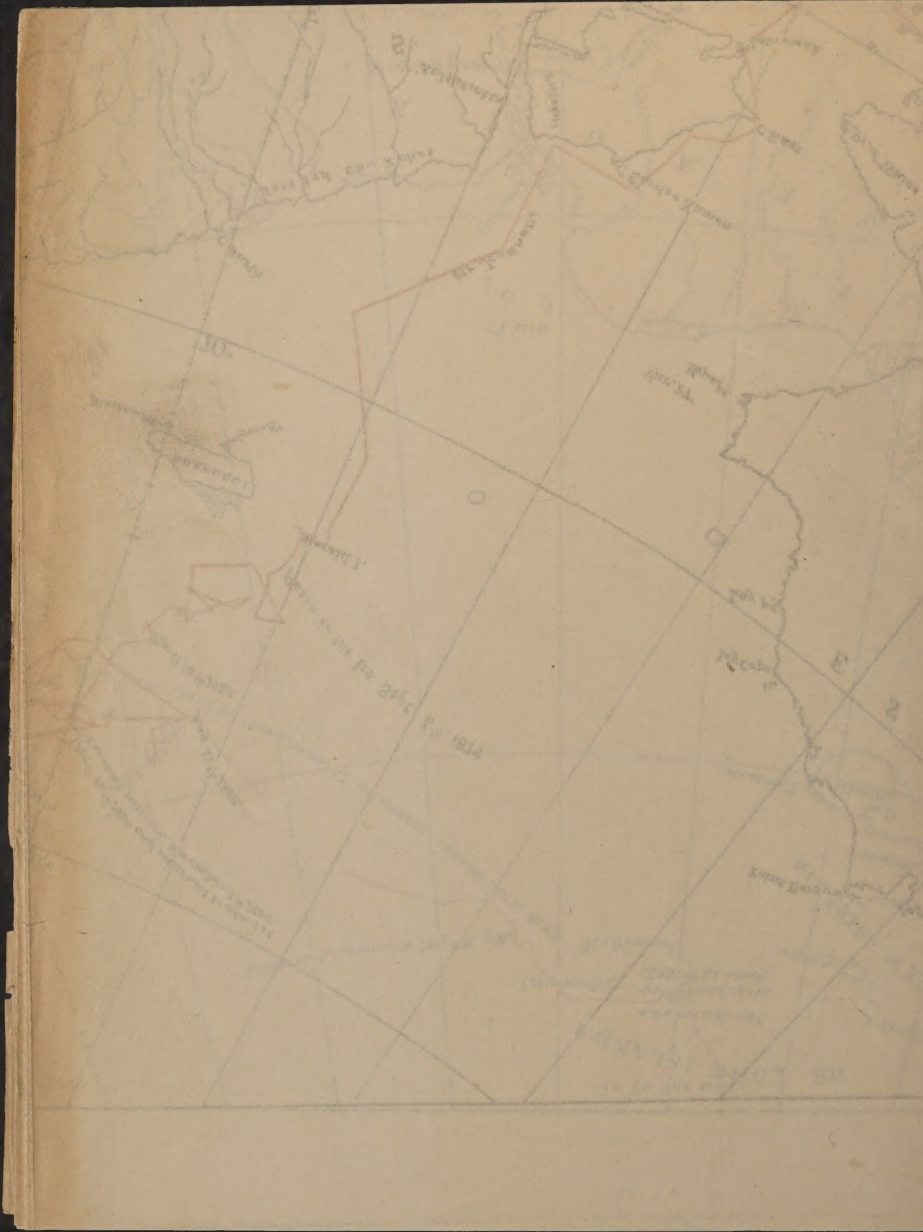
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Track chart of the U. S. S. JEANNETTE, Lieut.-Comm. GEORGE W. De LONG, from San Francisco, up to the sinking of the ship; together with the route followed by the officers and crew in their escape over the ice to the Siberian coast.

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